COAL AGE

Volume 17 New York, January 22, 1920 Number 4

Coal Strike Settlement Commission

By R. Dawson Hall

IT WAS quite natural, in view of the way in which the Coal Strike Settlement Commission was formed (as the result of a private deal on a Pullman car in which only representatives of the federal legal department and the unions were present) that the formation of a commission should, at first, be regarded with some disfavor by the operators. This attitude persisted even after the national authorities at Washington had recognized the understanding and shown themselves willing to overlook the fact that the pledge was given without instruction from the President and the Department of Labor.

The natural reaction of the operators continued even after the commission was appointed, despite the fact that against the individuals comprising the commission little or no complaint could be made. The members of the committee, Henry M. Robinson, Rembrandt Peale and John P. White, if they decide matters after due consideration and on their real merits, will render a verdict that may be immensely valuable in future disputes and which should furnish a basis for the settlement of like controversies in the luxury industries as well as in those that are basal.

It is fair that what is applied to one industry should be applied to another. Speaking in terms of weeks and months rather than years, the steady operation of a semi-essential industry like that of manufacturing automobiles is essential to the coal business, for if automobiles are not made, the iron and steel mills, furnaces and converters are idle, and the coal miner is unemployed. The miner therefore and his employer have just as much right to require the automobile manufacturer and his workmen to come to a speedy, and also equitable, agreement in case of a strike as for those latter to require the coal miner and the mine operator to reach such an early and just decision.

The commission, it is to be hoped, is bound, and disposed to recognize, only the understandings, verbal and otherwise, revealed to the public before its appointment. The socialist mine leader, Alexander Howat, of Kansas, declared that all kinds of concessions were promised the miners and that if the union leaders had revealed all the facts to him earlier he would have made absolutely no protest. This hint that there are further understandings of which the public has no knowledge is probably untrue. The commission is therefore almost sure to judge the whole matter on its merits.

It will be at a great disadvantage however. It will have extensive information about coal operations and no knowledge of other industries. Statistics are the weak spot of the coal industry. No occupation is more meticulously measured. Yardsticks are industriously applied by two bureaus at Washington, the Geological Survey and the Bureau of Mines. No one can object to such careful evaluations of fact. Some of them serve to aid the industry in establishing its position, but others always seem, by the advertising they receive from the bureaus, to militate unduly against it. Thus the irregular working of the mines is regarded as phenomenal, whereas temporary idleness is almost universal in all trades. Since, however, no inquiry has been made into the subject and some trades are so conducted that no simple statement of fact could possibly be made about them, we are suffered to believe that steady work is the general rule of industry rather than the exception.

Again, the inquiries into accidents have induced us to believe that the death and accident rate in the mines is far greater than it really is, as compared with the rates in other industries. The public is entitled to facts, but not to become acquainted with the conditions of one industry and to remain ignorant of the facts in others. Let us hope that the commission may not assume that what it does not learn or know about the irregularity of other occupations is only unlearned or unknown about them because there are no such irregularities in the conduct of their operations.

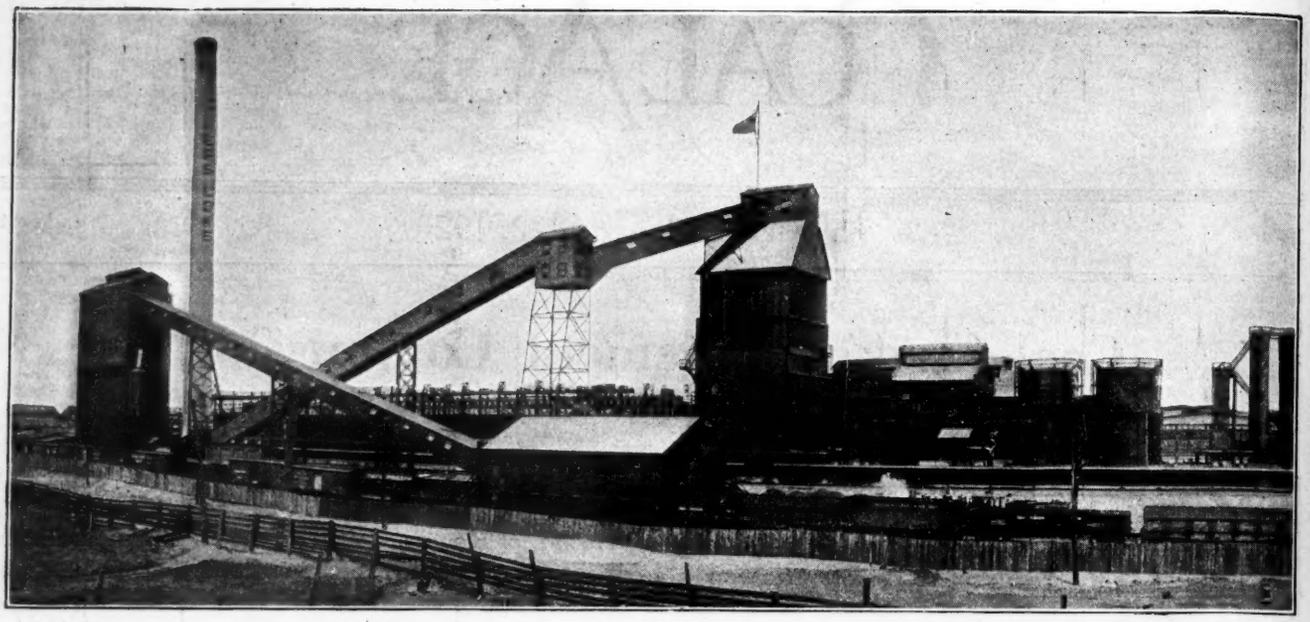


FIG. 1. GENERAL VIEW OF PLANT OF MINNESOTA BY-PRODUCT COKE CO., ST. PAUL, MINN.
From the left are: Coal crushing tower, stack, housing for inclined coal conveyor from coal dumping building in center foreground to t op of the coal crushing tower, housing for inclined coal conveyor from bottom of coal crushing tower to top of coal storage bins at end of Battery B, from which bins the larry car is loaded with coal to be charged into the ovens. In the left-hand background are the two batteries totaling 65 ovens. To right of battery storage bins in order are: By-product buildings, rich and lean gas holders, final gas coolers and light oil scrubbers.

Coking of Illinois Coal in Koppers-Type Oven*

An Operating Test at the St. Paul Plant of the Minnesota By-Product Coke Co. on the Coking of the Coal Extracted in the Orient Mine in Franklin County, Illinois

BY R. S. MCBRIDE† AND W. A. SELVIG‡
Washington, D. C.

THE great importance during the war period of substituting Mid-Continent coal for coals from more distant sources even in byproduct coke-oven work was well recognized. The Bureau of Standards was ordered to conduct an investigation of a new coke-oven process claimed to be especially suited to this purpose, and in connection with this the Bureau was requested to conduct a test of the St. Paul plant of the Minnesota Byproduct Coke Co., which is owned by the Koppers Co., Pittsburgh. The Bureau of Standards, in coöperation with the Bureau of Mines, carried out this operating test, using during 7½ days about 7700 tons of coal coming from the Orient Mine, Franklin County, Illinois.

The plant is usually operated with a mixture of Pittsburgh, Elkhorn and Pocahontas coal at normal coking times of about 16 and 17 hours. The normal capacity of the plant is approximately 1100 tons of coal per day. For the test period only Orient coal was used. Since the coking time for this coal was slightly longer than for the usual mixture, the capacity of the plant was reduced somewhat.

All phases of coal handling, byproduct recovery and laboratory tests were under observation by the staff of 37 Government engineers and chemists employed on the work. In addition, those in charge had the benefit of advice and comment from a considerable number of experts who are specialists in the field of coke-oven operation. The quantity of all coal used and of all byproducts obtained was carefully weighed or measured at regular intervals and samples of each material were taken for analysis. The Bureau of Standards was responsible for the general planning and supervision of the test work. Its representatives made all observations of battery operation, high temperature measurements, byproduct recovery and chemical laboratory work on gas and byproducts. The Bureau of Mines was responsible for the sampling of the coal both as it was loaded at the mine and as crushed at the plant. It supervised the weighing, coal-handling, coke-handling and coke-sampling operations and made all analyses of coal and coke. Its representatives also made general observations on the character of the coke and operation of the ovens.

The Minnesota Byproduct Coke Co. plant consisted of 65 ovens, built with a gross regenerative system, operating during the test period with an average gross coking time of 19 hours and 33 minutes, with coal finely pulverized, 12.75 tons per oven as charged. Each oven was 39½ ft. long, 9½ ft. high, 17 in. wide at the pusher side and 19¼ in. at the coke side, making a 2½-in. taper with an average width of 18¼ in. The coke was

*This is an advance publication in abbreviated form of Bureau of Standards Technologic Paper No. 137. Published by permission of the Directors, Bureau of Standards and Bureau of Mines.

†Engineer chemist, Bureau of Standards.

‡Assistant chemist, Bureau of Mines.

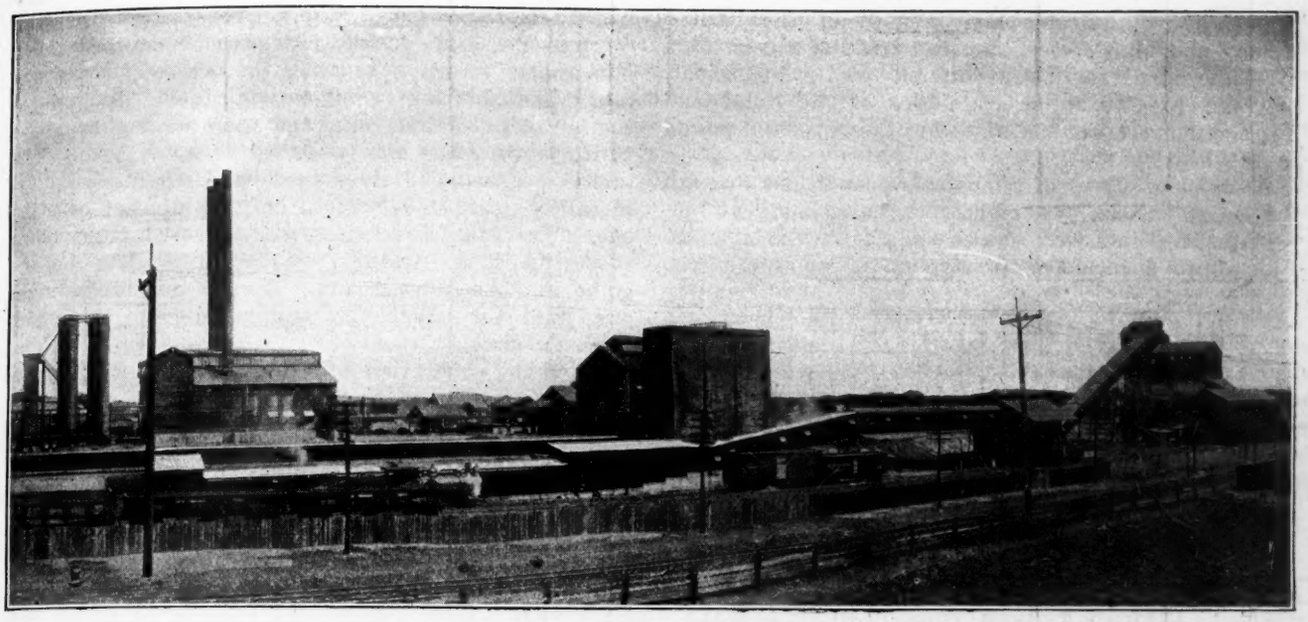


FIG. 2 GENERAL VIEW OF PLANT (CONTINUED)

In the foreground from left to right are shown: Coke wharf, housings for the coke conveyors, the first screening station where large furnace coke is separated from run of oven coke, and the housing for the inclined coke conveyor to final screening station, where the coke is further separated into small furnace and domestic sizes. In the background are the final gas coolers and light oil scrubbers, shown also in Fig. 1, the power plant, laboratory, complete light oil refining buildings and coke-quenching station.

discharged from the ovens by the usual style of ram pusher into the common form of hot coke car and quenched in a tower of the usual kind. After discharge on the wharf it was handled by a typical conveyor system through two screening stations. The coke was screened to produce large and small furnace sizes; stove, nut and pea, domestic sizes and breeze. The gas was separated into rich and lean at the battery. Separate test records were kept of each size of coke and of each quality of gas. Practically all of the ammonia produced was made up into sulphate immediately through the direct recovery process. Although the plant operated for the production of pure light-oil products, only the total production of light oil was measured, but the yield of various constituents was determined by analysis.

The coal was apparently clean and very well screened. The impurities consisted of a small amount of pyrite, mostly in the form of thin layers, calcite, mother of coal and shale. The coal was crushed at the plant with the intention of making it as fine as was feasible with the apparatus available. As charged to the ovens, over 95 per cent. passed through a 4-mesh sieve, and about two-thirds passed through a 10-mesh sieve.

A composite sample of the crushed coal sampled from the conveyor belt was made up from the daily plant samples and analyzed according to the laboratory methods described in Bureau of Mines Technical Paper No. 8; the results are presented in Table I. In Table II is given the total amount of coal used and the average coking time for the period of the test.

No consecutive record was maintained of the current necessary to push the oven charges. However, sufficient data were obtained to show that, in general, the charges pushed easily, though not as easily as with the usual coal mixture. It generally required from 180 to 250 amp. to start the charge and from 120 to 180 amp. to keep it moving; in an occasional oven the amperage required to start the charge amounted to from 300 to 350, with 200 to 300 amp. required to keep it moving. Very few of the charges stuck, so that it was impossible to push the charge out before the circuit breaker acted; as high as 550 amp. was noted in one or two of these cases. One charge in particular, oven No. 49, on Sept. 29, gave a great deal of trouble; three attempts were made to push the charge before it was possible to clear the oven. However, in no case was it necessary to rake or dig the coke from the ovens.

High temperature measurements were made continuously for several days during the test period in order to give an accurate idea of the operating conditions of the battery. Records were taken of the temperature in the oven walls, regenerators, waste-heat flue, in the coal mass and in the vapor above the coal. Measurement of high temperatures in a byproduct coke oven is attended with great difficulty because of the inaccessibility of certain points where temperature meas-

TABLE I. COAL ANALYSIS AND HEATING VALUE

	As Charged, per Cent.	Dry Basis, per Cent.
Moisture	8.07	....
Volatile matter	34.66	37.70
Fixed carbon	48.38	52.63
Ash	8.89	9.67
Sulphur	1.04	1.13
Hydrogen	5.32	4.81
Carbon	67.51	73.44
Nitrogen	1.49	1.62
Oxygen	15.75	9.33
Sulphur in fixed carbon from volatile determination	0.51	0.55
Heating Value:		
Calories	6,677	7,263
British thermal units	12,019	13,073

TABLE II. COAL USED AND OVEN OPERATION

Coal Used, in Tons:	
As charged	7,688.3
Dry	7,067.2
Ovens Charged	603
Coal per Oven, in Tons:	
As charged	12.75
Dry	11.72
Coking Time, in Hours and Minutes:	
Average gross	19:33
Average net	19:11

urements are desirable and because of the limited variety and high cost of apparatus which can be used for these purposes. The results obtained are sufficient, however, to give an accurate idea of the range and average temperature maintained at the important points in the heating system.

A complete survey of temperature conditions through the entire battery was, of course, impossible; but representative points were chosen and the results given in Figs. 3 to 6 inclusive are typical of all operations.

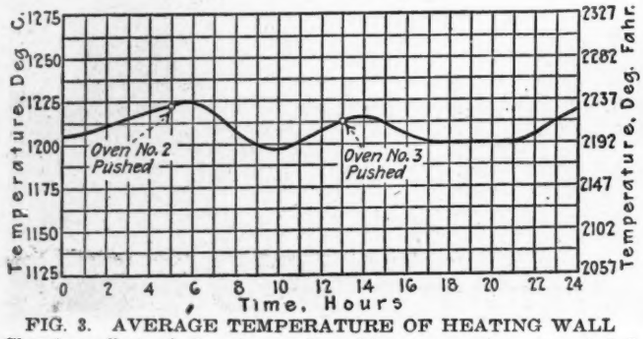


FIG. 3. AVERAGE TEMPERATURE OF HEATING WALL
Showing effect of charging and pushing temperature recorded 7 ft. below top of battery between ovens No. 2 and No. 3

During the period of the test certain optical pyrometer measurements were made by the company engineers which confirmed the fact that the locations chosen for our regular measurements were typical.

The general trend of heating wall temperatures, before, during and after charging the adjoining ovens, is given in Fig. 3. These temperatures, of course, are not as high as prevail in certain parts of the wall refractory, for example at the lower regulating brick near the air port, where the maximum temperature is reached. To show the effect of gas and air reversal on the temperature in the heating wall, the curve of Fig. 4 is given.

Temperature measurements were made at three places in four consecutive charges of coal in oven No. 3. Readings were taken with couples 10 ft. long, introduced through charging lids as nearly as possible midway between the oven walls. The mean of the temperature-time curves for these locations is plotted in Fig. 5. Short thermocouples were introduced through the charging lid nearest the pushing end of oven No. 3 to measure the vapor above the coal. Four curves for four consecutive charges are shown in Fig. 6.

Over the checker-brick in the right half of the regenerator under oven No. 3 at the coke end 54 in. in from the face of the regenerator wall the temperature averaged 1140 deg. C. The variation in temperature during reversal of direction of gas burning was about 55 deg. C. at this point. Temperature measurements taken at the junction of the waste heat tunnels from the two batteries averaged 272 deg. C.

During the test, two different systems of screening were used as follows:

Screening System No. 1—The coke was delivered by the conveyor over an inclined-bar-grizzly screen in the first station. The screen was about 5½ ft. long, 4 ft. wide and consisted of 1½-in. bars spaced from 1¼ to 1⅛ in. The oversize was delivered in the railroad cars and weighed as "furnace coke." The undersize delivered on a second belt conveyor was carried to a second screening station, where it passed through an inclined-rotary-cylindrical screen, the first half of which consisted of ¾-in. square perforations, and the second half 1⅜-in. square perforations. The material passing through the ¾-in. perforations was re-screened on a ½-in. shaker screen to separate the breeze and pea size coke. The material passing through the 1⅜-in. perforations was called nut coke, and that passing over the 1⅜-in. perforations was classified as stove coke. The breeze, pea, nut and stove sizes were separately loaded in railroad cars and weighed before shipment or storage. Nut and stove sizes, as delivered from their respective bins, passed over shaker feeders before going into the railroad cars. The pea and breeze sizes were thus very completely eliminated from these two domestic sizes.

Since the separation of "furnace coke" by the inclined-bar-grizzly in the first screening station was not considered satisfactory because the screen was not large enough to handle the quantity of coke passing over it and make a good separation, a change was made after three days of the test to the second system, which was as follows:

Screening System No. 2—The inclined-bar-grizzly in the first screening station was discarded and replaced by a 2½-in. rotary grizzly, the oversize of which was delivered directly into railroad cars as "foundry" or "large furnace" coke. The coke passing through the first rotary grizzly was carried to the second screening station, where it passed over a second rotary grizzly set at 1¾ in. The oversize of this second grizzly was designated as "small furnace" coke. The material passing through the second grizzly was separated by the rotary cylindrical screen and sized exactly as in the first system. The furnace coke from the first system and both sizes of furnace coke from the second system, after being weighed, were stacked in a pile at the plant during the test period, so that they were subsequently available for a blast-furnace test as described later. The stove, nut and pea sizes were sold for domestic fuel, as is customary from this plant. The breeze produced was used as boiler fuel at the plant, following the regular practice.

Table III shows the different results obtained from

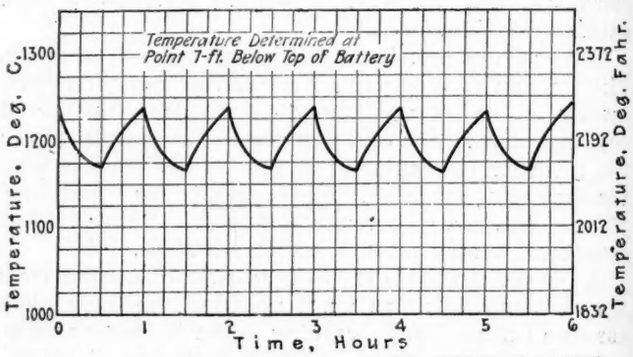


FIG. 4. TYPICAL HEATING WALL TEMPERATURE SHOWING EFFECT OF REVERSALS

the two screening methods. The results for the entire period are summarized together in Table IV.

It is to be noted that 82.7 per cent. of the dry coke produced in screening system No. 1 was classified as furnace coke, oversize of the 1¼- to 1½-in. inclined-bar grizzly. As explained under description of screening system No. 1, the separation of the furnace coke by the inclined-bar grizzly was not considered satisfactory, as the screen was not large enough to make a good separation; the very high percentage obtained for furnace size is, therefore, not representative. The total

dry furnace coke was only 40.3 per cent. of the total dry coke screened during that part of the test when screening system No. 2 was used. However, it should be noted that the yield of stove size is very large, 34.8 per cent. of the total coke as screened; there is no doubt that a large amount of the stove size would have been included in the furnace size if it had been possible to install a 1½-in. inclined-grizzly-bar screen large enough to handle the coke produced and make a good separation.

The small percentage of large-size coke obtained together with the large percentage of the smaller domestic sizes indicated that it would not stand handling and screening without breaking up into smaller pieces, due to the fingery and brittle characteristics of the coke.

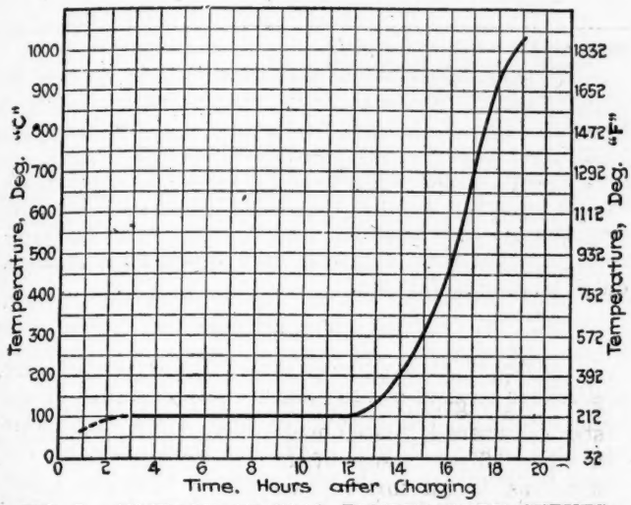


FIG. 5. AVERAGE OF COAL TEMPERATURE CURVES

The hot coke as pushed from the ovens was observed in order to know the temperature and general performance of each oven and each lot was again observed after quenching and dumping on the wharf. By these observations a very complete idea of battery performance was obtained. These observations may be summarized as follows:

TABLE III. RESULTS WITH TWO SCREENING SYSTEMS

	Screening System No. 1, per Cent.		Screening System No. 2, per Cent.	
Furnace Sizes:				
Large	...		18.3	
Small	...		22.0	
Total		82.7		40.3
Domestic Sizes:				
Stove	6.7		34.8	
Nut	5.2		15.0	
Pea	0.9		2.4	
Total		12.8		52.2
Breeze		4.5		7.5
Total		100.0		10.00

The top of the coke mass was, as usual, colder than the rest of the charge. In fact this condition was somewhat exaggerated during the test, as it was impracticable to adjust the battery for the best use of the leaner gas from the Illinois coal when this was to be used for so short a period. From the level of the horizontal flue in the heating wall down to the bottom of the oven the coal was usually thoroughly coked; and in general the heats were uniform for the entire length of the charge. From a number of the charges some uncoked material remained in the center of the charge at the level of the horizontal flue.

From most of the charges a large amount of smoke and flame arose as the coke was pushed from the oven; this was especially noticeable in cases where uncoked material remained at the level of the horizontal flue. The overhang of the coke as it fell from the coke guide into the quenching car was irregular; on the coke side it ranged from 12 to 24 in., while on the pusher side the coke frequently showed signs of crumbling. Immediately ahead of the pusher ram the charge generally crumbled, thus causing a great deal of fine coke. A distinct line of cleavage was noted through the center of the charge in almost all cases.

The coke on the wharf was very irregular in size, but on the average the pieces were distinctly smaller than for the average byproduct coke mixtures. There was no tendency to blockiness and very few pieces were as large as 6 in. in each dimension. The material was decidedly lighter than the average byproduct oven coke, weighing only about 23 lb. per cu.ft. The color varied somewhat, but in general the furnace-size was of a dark silver color.

TABLE IV. COKE YIELDS

Coke Produced (Dry):	Tons
Furnace	2,704.4
Stove	1,178.1
Nut	549.5
Pea	89.9
Breeze	308.4
Total	4,830.3
Ratio of Dry Coke to Dry Coal:	Per Cent.
Furnace	38.3
Stove	16.7
Nut	7.7
Pea	1.3
Breeze	4.4
Total	68.4
Sizes of Coke Produced:	Per Cent.
Furnace	56.0
Stove	24.4
Nut	11.4
Pea	1.8
Breeze	6.4
Total	100.0

The coke had a decided longitudinal fracture and many of the pieces before reaching the wharf were broken up into fingers. Even the larger pieces showed a tendency to fingering, and by completion of the decided longitudinal fracture generally these broke up into several smaller pieces before reaching the cars. There was no apparent cross fracture, but the brittleness of the long fingers was such that these frequently broke up into shorter pieces during handling.

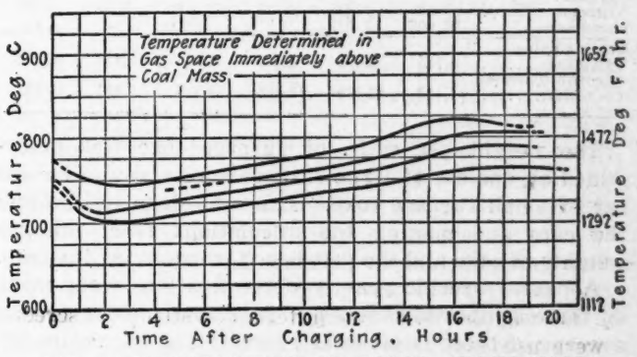


FIG. 6. TEMPERATURE OF VAPOR ABOVE COAL

In the railroad cars the furnace size from screening system No. 1, in which a 1½-in. inclined-bar-grizzly

screen was used, consisted mainly of small fingers from 1 by 2½ in. up to a maximum of about 2 by 6 in. There were very few blocky pieces about 2½ by 3½ in. The oversize of the 2½-in. rotary grizzly, used in screening system No. 2, in the cars was about half fingery and half blocky coke, averaging much larger than from screening system No. 1. The small-furnace size from this second system, through the 2½-in. but over the 1¾-in. rotary grizzly, averaged about 2 by 2½ in. The great difference in size between the coke on the wharf and after loading in the cars shows the decided tendency to breakage during handling.

The cells of the coke were small and regular and in general of a structure indicating suitable characteristics for furnace use. There was no sponge formed, but there was a decided tendency to form a pebbly seam at a distance of 2 to 6 in. from and, in general, parallel to the oven wall. This seam appeared only in a part of the pieces in which it formed an incipient cross-fracture. In general there were no pebbly seams in the coke at the bottom of the oven. The small amount of pebbly mass noted seemed to come from the top and center of the oven in the form of small loosely-cemented lumps of material which were readily crumbled in the hands. Although the coal contained considerable "mother of coal," there was very little evidence of "foreign matter" in the coke, probably because of the fineness to which the coal was crushed.

Each size of coke was carefully sampled for analysis and for determination of moisture content in order to correct to true weight at the time it was loaded in the railroad cars.

The results of proximate and ultimate analysis and heating value determination of the composite sample of each size of coke are given in Table V.

TABLE V. COKE ANALYSIS AND HEATING VALUE

	Furnace Coke		Domestic Coke		Coke Breeze	
	As Loaded Per Cent.	Dry Per Cent.	As Loaded Per Cent.	Dry Per Cent.	As Loaded Per Cent.	Dry Per Cent.
Moisture	7.15	.....	11.51	.....	17.07	.....
Volatile matter	2.18	2.35	2.81	3.18	4.06	4.90
Fixed carbon	77.93	83.93	73.15	82.66	64.69	78.00
Ash	12.74	13.72	12.53	14.16	14.18	17.10
Sulphur	0.85	0.92	0.82	0.93	0.87	1.05
Carbon	77.81	83.80	3.47	83.03	65.68	79.20
Hydrogen	1.17	0.41	1.67	0.44	2.54	0.77
Oxygen	6.55	0.20	10.60	0.41	15.83	0.79
Nitrogen	0.88	0.95	0.91	1.03	0.90	1.09
Phosphorus	0.009	0.010	0.010	0.011	.....	.....
Heating Value:						
Calories	6,385	6,877	6,049	6,836	5,453	6,576
British Thermal Units	11,493	12,379	10,888	12,305	9,815	11,837

The weight per cu.ft. of furnace coke was determined on one car of large furnace coke and also on one car of small furnace coke. This was done by leveling the cars and making the calculations from the net weights of coke and the rated cu.ft. capacity of the cars.

Apparent specific gravity determinations were made on three composite samples of furnace-size coke and an average of these is given as representing the entire lot. A single composite was made up for the entire lot and the true specific gravity determined. The porosity of the coke was calculated from these results for apparent and true specific gravity. These physical properties of the furnace coke may be summarized as in Table VI.

In order to test the behavior of the furnace-size coke produced from the Orient coal, arrangements were made to use about 1800 tons of this material in the blast-furnace plant of the Mississippi Valley Iron Co. The coke regularly used at that furnace is produced in Koppers ovens of the Laclede Gas Light Co., St. Louis, from a mixture of Elkhorn, Pocahontas (low volatile) and Illinois coals. The substitution of the Illinois coke for the regular supply was accomplished abruptly and continued without interruption throughout the ten-day period. Several experts were present during this test, and it was the unanimous opinion of those persons and of the blast-furnace operators that the Illinois coke had shown highly satisfactory results. However, it should be borne in mind that the furnace used for this test was of small capacity, and it is not certain, therefore, that the results in this case would be duplicated on a large-size furnace.

TABLE VI. CHARACTERISTICS OF FURNACE COKE

Weight per Cubic Foot of Dry Coke:	
Furnace size from screening system No. 1	23.4 lb.
Large furnace size from screening system No. 2	22.8 lb.
Apparent specific gravity	0.88
True specific gravity	1.85
Porosity	52.4%

Special Oven Tests

In order to study the effect of lower temperature and longer time of coking, and to get some idea of the value of certain special coal mixtures, a few ovens were operated under different conditions than normal. The lower temperature trials were made in oven No. 1 during the period of the test by cutting down the quantity of gas burned in the heating walls of this oven. The special mixtures were made up at the end of the test period and tried out in one or more ovens.

Low Temperature Coking of Orient Coal—Oven No. 1 was changed from its regular operating period beginning Oct. 1 and three charges of distinctly longer periods, 22¾, 23½ and 25¾ hours, were pushed on Oct. 3, 4 and 5 respectively. The temperature of this oven was from 50 to 100 deg. C. lower than the temperature of the remaining ovens in the battery. The coke from these special tests was very similar to that obtained from the same coal coked for the usual 19-hour period in that the cell structure was not materially different and that there was the usual small amount of "foreign matter" and no sponge. However, the material as it lay on the wharf appeared decidedly larger and blockier and there was slightly less of the pebbly mass or pebbly seam. The blocks of coke were decidedly stronger, judged both by their action when handled and by the shatter test described below. The results of this special work at lower temperatures were very closely comparable with the results obtained at Dover, Ohio, when using the same coal in a narrower oven and coking at a corresponding rate, measured in inches of coke formed per hour. It is evident from these tests that stronger, larger coke will be obtained at the somewhat lower temperatures used in this work than at the temperature at which it was necessary to operate during the full test at St. Paul in order that the gas supply of the city would not be interrupted.

Mixture of Orient and Pittsburgh Coals—In order to study the character of coke produced from a mixture of equal parts of Pittsburgh and Orient coals, a single oven was charged with this mixture. Oven No. 60 was charged 5:30 p.m. Oct. 7, and pushed 11:30 a.m. Oct. 8; the charge was 25,100 lb. The coke from this 18-hour test was thoroughly coked, but the appearance on the wharf was not encouraging. There was decided

longitudinal fracture, indicating the fingery tendency common to high volatile coals, but the coke was fairly tough. The cell structure resembled that of Orient coal alone, except in the upper central section of the oven, where considerable sponge was formed. There was no noticeable cross-fracture, but the irregular shapes showed that the breakage of the material in regular handling would probably be rather high. The pebbly seam so frequently noted in coke from 100 per cent. Orient coal was not apparent in this single test; but the tendency of Pittsburgh coal to produce sponge was not counteracted by the mixture.

Mixture of Orient and Pocahontas Coals—A mixture of 25 per cent. Pocahontas and 75 per cent. Orient coal was used in three ovens charged on Oct. 7 and pushed after approximately 17 hours of coking. In each case the charge was about 25,200 lb. The coke produced under these conditions was blocky and on the average of large size, but the pieces were very irregular. There was no tendency to finger, but a decided cross-fracture was shown. The coke, although appearing soft, was unusually tough, as will be evident from the high percentage unbroken in the shatter test. The cell structure was irregular and the general appearance of the material on the wharf would have indicated undercoking, but the appearance while hot, as it was pushed from the oven, showed that this was not the fact. The very small percentage of fine material indicated that an unusually high percentage of furnace-size would be available from this mixture.

Shatter Test of Special Cokes—In order to get a rough check on the relative strength of the different special cokes which were made, a shatter test was carried out on each of the samples. For this test a 50-lb. sample of large pieces of coke taken from the belt, none of which pieces would begin to pass through a 2-in. square mesh screen, was dropped four times from a height of 6 ft. onto an iron plate. The pieces of coke which following this test would not in any position pass through the 2-in. screen were weighed and their ratio to the weight of the original sample was taken as the "percentage unbroken" in results indicated below.

The usual foundry mixture, consisting of 30 per cent. Pocahontas, 35 per cent. Pittsburgh and 35 per cent. Elkhorn coal, was found to give a result of 68 per cent. unbroken by this test. The straight Orient coal coked for 19 hours gave a coke of which only about 27 per cent. remained unbroken by this test. The coke obtained from 22- to 26-hour coking periods was somewhat stronger, ranging from 27 to 38 per cent. unbroken. The mixture of 50 per cent. Orient and 50 per cent. Pittsburgh showed about 53 per cent. unbroken, and the mixture of 25 per cent. Pocahontas with 75 per cent. Orient was strongest of all, with 74 per cent. unbroken.

The foregoing results are merely an indication and must not be taken as any accurate measure of the strength, since only a limited number of tests were made. Large irregularities are always found in this kind of testing and moreover this test is not strictly significant as to the strength of the material, since at the best it really gives an accurate measure only of the likelihood of breakage during handling.

The results obtained during six days from 8 a.m., Sept. 29, 1918, to the same hour Oct. 5, 1918, were used as the basis for byproduct and gas results, since during this period only Orient coal was in use and the system contained only products from this coal. During this period 6092.3 tons of natural coal were charged to the ovens, equivalent to 5600.6 tons on the dry basis, and these figures are used in calculating the yield of tar, ammonium sulphate, light oil and its products, and gas, which are reported in the following sections.

During the test, daily inventory was taken of the quantity of the tar and liquor in stock, accurate weights and specific gravities of tar shipments were recorded, and other necessary arrangements made to permit accurate determination of the quantities of these materials produced.

TABLE VII. YIELD AND CHARACTERISTICS OF TAR

Tar produced, as measured, gal	47,560
Tar produced, dry (computed), gal	46,100
Tar, as produced, per ton of coal as charged, gal	7.81
Tar, dry, per ton of dry coal, gal	8.23
Water in tar, by weight, per cent	2.6
Specific gravity, as produced	1.187
Specific gravity, dry basis (computed)	1.192

It was the intention during the test to produce only ammonium sulphate and maintain the minimum practicable supply of ammonia liquor. However, a slight variation in the quantity of liquor at the beginning and end of the test inevitably resulted, and appropriate correction for this difference in inventory was made and appears in the record of results reported. Samples of the tar, liquor and sulphate were taken for analysis regularly, so that the quality as well as the quantity of these materials would be a matter of record.

The sulphate delivered from the saturators into wheelbarrows was weighed as it was conveyed from the saturator room to the storage pile. The weight of sulphate produced daily varied largely in accordance with the amount of ammonia liquor accumulated or worked up into the sulphate during the day. From the measurement of volume, the temperature, specific gravity, and per cent. of NH_3 by weight, as determined in the laboratory test, the pounds of NH_3 and the equivalent weight of $(NH_4)_2SO_4$ were computed for the initial and final inventories.

The rich and lean gas produced at this plant are separately scrubbed for light oil recovery, but the light oil separated from the wash oil in the stripping stills is collected together. During the test period two sections of the light oil "running tank" were used on alternate days in order to permit careful measurement of each day's light oil production.

TABLE VIII. YIELD OF AMMONIUM SULPHATE

Produced, scale weight, lb	155,510
Produced, pure, lb	151,100
Equivalent liquor, start of test, pure, lb	15,920
Equivalent in liquor, end of test, pure, lb	34,700
Equivalent due to liquor increase, pure, lb	18,780
Total production, pure, lb	169,880
$(NH_4)_2SO_4$ per ton of coal as charged, lb	27.88
$(NH_4)_2SO_4$ per ton of dry coal, lb	30.33
NH_3 per ton of coal as charged, lb	7.19
NH_3 per ton of dry coal, lb	7.82
Average of NH_3 in ammonium sulphate produced, per cent	25.06

Table IX gives the total production of light oil for the six-day byproduct period and the yield based on the analysis of the composite sample analyzed according to methods prescribed in Ordnance Publication No. 1800.

The gas produced at the plant was separated at the ovens into rich and lean, the quantity of rich gas being so regulated as just to supply the requirements for the St. Paul Gas Light Co., to which all of this

TABLE IX. LIGHT OIL YIELD AND ANALYSIS

Produced, gal.	22,570
Composition:	Per Cent.
Boiling under 200 Deg. C. (Engler Flask)	84.4
Washing loss	5.7
Steam distillation residue	5.5
Benzene (Laclede still)	56.8
Toluene (Laclede still)	13.4
Solvent Naphtha (Laclede still)	3.5
Residue	15.1
Produced per Ton of Coal:	Gal.
As charged	3.71
Dry	4.03
Produced per Ton of Coal: (Per Cent. under 200 Deg. C.)	Gal.
As charged	3.13
Dry	3.40
Benezene per Ton of Coal:	Gal.
As charged	2.11
Dry	2.29
Toluene per Ton of Coal:	Gal.
As charged	0.497
Dry	0.540
Solvent Naphtha per Ton of Coal:	Gal.
As charged	0.130
Dry	0.141

gas is sold. The lean gas remaining was used for heating the battery, and, if there was any excess, for firing the boilers.

The average analysis and total production of gas for the six-day byproduct test period, together with the yield per ton of coal and relative heating value calculations, are presented in Tables X and XI.

As a result of the test it is clearly demonstrated that

TABLE X. GAS ANALYSIS

	Rich Gas, per Cent.	Lean Gas, per Cent.
CO_2	4.5	3.8
Illuminants	4.4	2.4
O_2	0.6	0.4
CO	11.0	12.4
CH_4	31.5	25.1
H_2	42.4	50.7
N_2	5.6	5.2
Sp.gr. (Air = 1)	0.476	0.437
H_2S (grains per 100 cu.ft.)	420	340

some of the Illinois coals can be coked in the "chamber-type" oven without radical change in operating methods for the production of coke which can be successfully used in a blast furnace. However, it appears that the temperature at which Illinois coal should be handled for the production of the best coke is somewhat lower than the best operating temperatures for Eastern coals and moreover the speed of coking of the Illinois coal is somewhat less. The yield of gas and byproducts from Illinois coal of the kind tested is excellent both in quantity and quality. Of course the coal tested in this case represents one of the best Illinois coals for coking purposes, being lower in ash and sulphur and otherwise superior to many from this field.

TABLE XI. GAS PRODUCTION

Coal Used:	Tons
As charged	6,092.3
Dry	5,600.6
Volume of Gas Produced:	M.Cu.Ft.
Surplus—Rich to City	31,982
Lean to boilers	1,440
Total surplus	33,422
To Ovens—Battery A	2,842
Battery B	29,015
Total to ovens	31,857
Total gas made	65,279
Gas per Ton as Charged:	Cu.Ft.
Surplus	5,490
To ovens	5,230
Total	10,720
Gas per Ton of Dry Coal:	
Surplus	5,970
To ovens	5,690
Total	11,660
Gas to ovens (Per cent. of total)	48.8
Heating Value of Gas:	B.t.u. per Cu.Ft.
Rich	569
Lean	490
Heat in Gas per Pound of Coal as Charged:	B.t.u.
In surplus gas	1,550
In gas to ovens	1,280
Total	2,830
Heat in Gas per Pound of Dry Coal:	B.t.u.
In surplus gas	1,690
In gas to ovens	1,390
Total	3,080
Heat in gas used to coke coal, per cent	45.2

In general, the comparison of Eastern coking coals with those from the Mid-Continent field must be made upon an economic basis, since which source will be preferable depends altogether on local conditions which will affect the cost of the material and the relative expense of handling. These phases of the question have, however, not been discussed in this report.

The authors wish to acknowledge the assistance and coöperation of the engineers and chemists who were associated with them in this work, as well as that of T. G. Janney, manager, and K. G. Richards, superintendent, of the plant, and F. W. Sperr, Jr., chief chemist of the Koppers Co., all of whom did all in their power to make the work both pleasant and successful. Special acknowledgement is also made of the great assistance which I. V. Brumbaugh has given us in working up the data contained herein and in preparing this manuscript.

Coal as a National Asset

Enough has been said, perhaps, to indicate how vast are the fields of coal which this country holds. It may be that any day some genius will release from nature a power that will make of little value our carboniferous deposits save for their chemical content. By the application of the sun's rays, or the use of the unceasing motion of the waves of the sea, the whole dependence of the world upon coal may be upset. That day, however, has not yet come; and until it does we may consider our coal as the surest insurance which we can have that America can meet the severest contest that any industrial rival can present. It is more than insurance—it is an asset which can bring to us the certainty of great wealth, and if we care to exercise it, a mastery over the fate and fortunes of other peoples.

Next to the fertility of our soil, we have no physical asset as valuable as our coal deposits. Although we are sometimes alarmed because those deposits nearest to the industrial centers are rapidly declining and we can already see within this century the end of the anthracite field, if it is made to yield as much continuously as at present, yet it is a safe generalization that we have sufficient coal in the United States to last our people for centuries to come. An extra scuttleful on the fire or shovelful in the furnace does not threaten the life of the race, even if some Russian or Chinese of the future does not resolve the atom or harness the hidden forces of the air. Whatever fears other nations may justifiably have as to their ability to continue in the vast rush of a machine world, there can be no question of our ability to last.

The recent strike, however, makes quite clear, perhaps for the first time, that it is not the coal in the mountain that is of value, but that which is in the yard. And between the two there may be a great gulf fixed. Therefore, we are put to it to make the best of what we have. We turn from telling how much coal we use to a study of how little we can live upon and do the day's work of the nation. And this is, I believe, as it should be. Indeed, I feel justified in saying that the problem of this strike was soon solved.

Conditions in Alabama in 1919

By Erskine Ramsay
Birmingham, Ala.

THE years 1917 and 1918 were marked with great strenuosity, patriotic efforts being made by both operator and miner in Alabama, as in all the others, to produce the maximum output of coal which was needed to meet the unheard-of demands coming from all branches of business, because of the extra efforts all were making to help win the war.

After the signing of the armistice in November, 1918, there was a decided let-up in the demand for coal, and as a result on Jan. 1, 1919, the coal-mining industry over the whole country was confronted with a large supply of fuel in stock.

Alabama had its full share of stocked coal to contend with. There was a sharp decrease in railroad and industrial fuel consumption and a mild winter reduced domestic demands. During the early months of the year, in addition to the slackening of activity of various war industries and the railroads, many blast furnaces throughout the Birmingham district shut down for the want of business and as such furnaces consume the greater part of the coke made in Alabama, this brought about a serious decrease in the production of coking coal.

The general coal production gradually slowed up until March 1, 1919, when the output was probably not above 60 per cent of normal. Beginning with July 1, 1919, approximately 750,000 tons of railroad fuel heretofore supplied by Alabama mines was transferred to eastern Kentucky and Tennessee fields. This, coupled with a loss of close to 1,000,000 tons of fuel oil, at Gulf and South Atlantic ports and near-by territory, resulted in a further loss of running time.

Beginning with Sept. 1, 1919, the demand materially improved, but the output could not be brought up on account of a short car supply which for some time did not average over 60 per cent of the requirements.

The Alabama mines were operated during all of 1919 under the Garfield agreement, which, from its beginning on May 15, 1917, proved satisfactory. The mines ran with little or no trouble and any question between operator and miner was quickly and satisfactorily settled without difficulty by reference, when necessary, to Judge H. C. Selheimer, umpire, who was appointed by Dr. Garfield to handle questions requiring his attention, as and when they arose. He is handling his work with great satisfaction to everybody concerned.

The nation-wide strike called on Nov. 1, 1919, did not affect Alabama's output seriously, as it did some other sections of the country. Many of the mines, and this included nearly all of the larger ones, continued to operate at practically 100 per cent capacity during November. After the wage increase of 14 per cent was fixed by Dr. Garfield, it was made effective by the Alabama operators on Dec. 1. This has increased the cost of production in many cases to a point where the operator faces a loss.

The demand for pig iron increased considerably about Oct. 1, and as a result a number of the furnaces that had gone out of blast earlier in the year resumed operation. The outlook for 1920 in the iron business is good. It is expected that the furnaces will continue in practically full operation during the year. Since the coke ovens and other operations of the iron companies consume a large proportion of the total Alabama output, it is felt that the production for the year will be fairly good.

As is well known, a large portion of Alabama's miscellaneous steam-coal business comes from cottonseed-oil mills, their refining plants, steam cotton gins and fertilizer plants, of which there is a considerable number tributary to our district. The very nature of their business causes them to close down or suspend operations during the spring months. Throughout the summer and until late in the fall they are idle, as a rule. Of course, they consume no coal during this period. If it could be made to the advantage of this kind of a coal consumer to put in a year's supply, beginning, say, April 1, it would be of great benefit by employing miners more steadily during the summer, by

SLOSS-SHEFFIELD STEEL & IRON CO.'S NEW BYPRODUCT COKE-OVEN PLANT

PITMOUTH AND FAN HOUSE, VIRGINIA MINE, GULF STATES STEEL CO.

DISTRIBUTION OF ALABAMA COAL

Uses	Per Cent
Coal made into coke	33
Iron companies	10
Railroads	20
Steamships	5
Domestic purposes	10
Miscellaneous steam purposes	22
Total	100

giving the railroads more tonnage during their dull season, and relieving both equipment and human effort from the strenuous period which always comes during the fall and winter months.

The same condition applies to all fixed, stable steam plants, municipal as well as privately owned, and also railroads. It is recognized that some extra expense would be incurred, first in the preparation of a place wherein to store the coal and second in picking it up for consumption. This could be well and profitably borne by the miner, the coal operator, and the transportation company, each making a proper sacrifice, which in the end would be offset by their gaining steady all-year-round work.

The managers of a plant with its winter season's supply of coal on hand, say, by Oct. 1, would have a feeling of independence not always present under prevailing conditions. Concerns of standing would have no trouble in making payment for both coal and transportation, by giving acceptances due at periods estimated to cover the coal as consumed. A lower range of prices could be quoted by operators and dealers, and lower freight rates would encourage the movement of coal during the spring and summer months.

NUMBER AND KIND OF COKE OVENS IN ALABAMA JAN. 1, 1920

County	Beehive	Byproduct	Total
Jefferson	5,739	*1,074	6,814
Tuscaloosa	665	60	725
Walker	660	....	660
St. Clair	60	....	60
Etowah	....	37	37
Total	7,124	1,171	8,295

* The above includes the 120 byproduct ovens of the Sloss-Sheffield Steel & Iron Co. nearing completion in Jefferson County; also 50 byproduct ovens of the Birmingham Coke & By-Product Co., nearing completion in Jefferson County.

ALABAMA COKE PRODUCERS SHOWING NUMBER OF BEEHIVE AND BYPRODUCT OVENS

Jan. 1, 1920

Company	Beehive Ovens	Byproduct Ovens	Total
Tennessee Coal, Iron & Railroad Co.	1,746	434	2,180
Sloss-Sheffield Steel & Iron Co.	1,177	*120	1,297
Republic Iron & Steel Co.	908	....	908
Alabama Co.	894	....	894
Woodward Iron Co.	300	230	530
New Castle Coal Co.	374	....	374
Semet-Solvay Co.	....	300	300
Birmingham Trussville Iron Co.	301	....	301
Sheffield Iron Corporation	300	....	300
Gulf States Steel Co.	451	37	488
Imperial Coal & Coke Co.	103	....	103
Yolande Coal & Coke Co.	100	....	100
Jennifer Furnace Co.	100	....	100
Empire Coal Co.	100	....	100
U. S. Cast Iron Pipe & Fdy. Co.	100	....	100
Pratt Consolidated Coal Co.	60	....	60
Seaboard Coal & Coke Co.	60	....	60
New Connellsville Coal & Coke Co.	50	....	50
Birmingham Coke & By-Products Co.	....	* 50	50
Total	7,124	1,171	8,295

* Now in building in Jefferson County.

This particular feature of the coal business is of vast importance to the whole country. The railroads are often not able to handle the business offered them during the fall and winter, and until some satisfactory plan is worked out to solve the problem, we will continue to experience coal famines in portions of the country during the winter period.

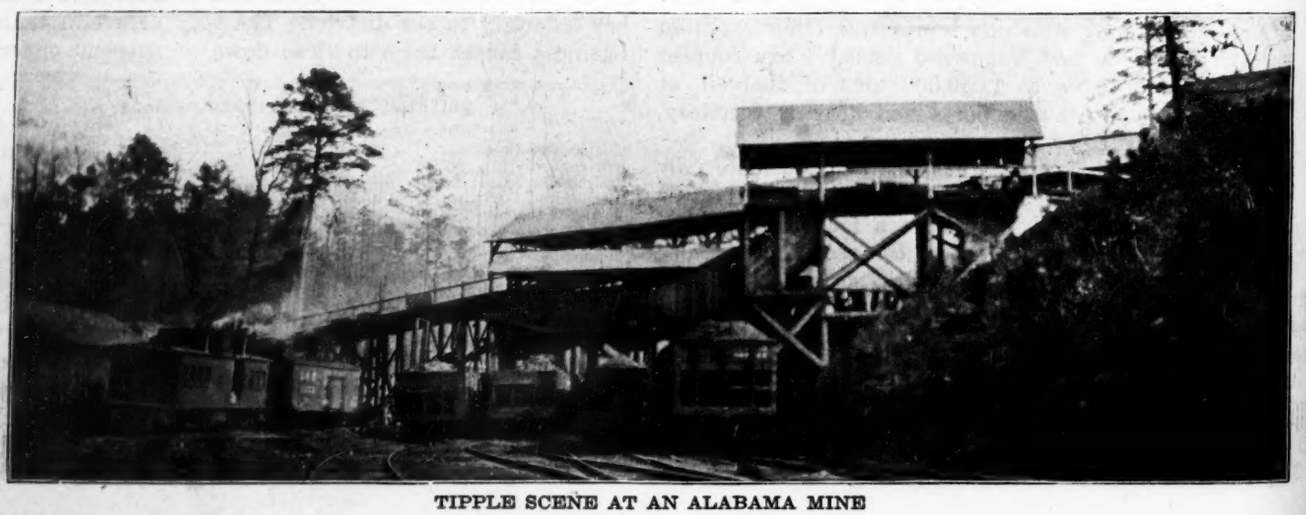
Such an arrangement of seasonal prices would somewhat follow the long-established practice of the anthracite people. The practical working of this plan has been quite satisfactory.

Since the completion of the locks, the use of the Warrior River as an outlet to the sea for coal and other products from this district presents an encouraging outlook for the future. During the year 1919 some 115,000 tons of coal were shipped by this waterway to Mobile and New Orleans. Much of this coal was used to bunker ships calling at these ports. Development of coal mines along the river will be made to take advantage of the additional barges and towboats now being built by the Government. The Port of Birmingham near Short Creek is now being equipped with facilities for handling material shipped from the Birmingham district down the river, as well as for merchandise coming up the stream. Steel is being shipped down the river to the large shipbuilding plants at Mobile. The shipbuilding industry promises great growth and will afford a substantial market for Birmingham products. The distance from the coal mines to the Gulf is about 400 miles and the river is used throughout the entire year, there being no difficulty here with freezing as is the case farther north.

The reports compiled by Chief Mine Inspector Nesbitt show that fewer fatal accidents have occurred in the mines during 1919 than in any year for the past 15, with one exception. The decrease in fatalities is due, in a large measure, to the safety instructions given the employees during the past several years. The Alabama Safety Association is doing much good instruction work along the line of preventing accidents and also in furthering the application of first aid to the injured.

The Tennessee Coal, Iron & Railroad Co., a U. S. Steel Corporation subsidiary, has been and is the leader in establishing the most modern mining plants, together with all that goes with them in the way of towns having the most up-to-date houses, stores, schools, kindergartens, churches, hospitals, bath houses, etc.

Other companies, however, have done also their full part in work of this character.



TIPPLE SCENE AT AN ALABAMA MINE

Coal Mining Laws Compared

By Alex Moss
New York City

SYNOPSIS—*A few tabulations of the requirements of the mining laws in regard to quantity of air, number of men on each split, spacing of crosscuts, distance in advance of air, number of men allowed in mines with single openings, distance between openings, spacing of refuge holes, clearance for cars and drilling for water.*

WHAT is deemed a safe measure of precaution in one state, insofar as the conditions surrounding coal mining are concerned, is often disregarded by some other state in the drawing up of rules and regulations intended to safeguard the workers in its coal mines. Of course, local conditions, local preferences and local practices quite often decide whether a rule promulgated for the safety of the underground workers be rigid or flexible. The basic idea, however, underlying the mining laws adopted by the different coal-mining states is the same, namely, to protect the lives and health of the mine workers, and it is of interest therefore to observe how with a single purpose in mind and conditions so equal such differences in legislation as exist have been allowed to continue.

Of first importance to the underground workers in the mines is plenty of air. Without a continuous circulation of fresh air it would be impossible to carry on operations. Rules for ventilation therefore have received the careful attention of the lawmakers, and important differences can be noted in essentials. Ventilation requirements that lend themselves readily to tabulation have been presented in that form in Table I.

TABLE I. COMPARISON OF VENTILATION REQUIREMENTS

State	Cu.Ft. of Air per Man per Min.	Cu.Ft. of Air per Animal per Min.	No. of Men Permitted on Each Split	Break-Throughs, Distance Apart, Ft.	Permissible Distance of Air from Working Place
Alabama	100	500	...	70	....
Arkansas	100	...	50	40	....
Gaseous	...	...	...	30	....
Colorado	100	500	100[1] 65[2]	(See Note)	60
Illinois	100	500	100	60	60
Gaseous	150	...	...		
Indiana	100	300	50	45	....
Iowa	100	500	80	....	60–70[3]
Kansas	100	...	...	40	....
Kentucky	100	...	...	90	60
Maryland	100	...	...	Big vein 35 Other veins 25	....
Michigan	100	300	100	....	....
Gaseous	200	600			
Missouri	100	600	50	....	....
Montana	100	600	...	60	....
Gaseous	150	...	...		
New Mexico	100	300	...	....	....
Ohio	150	500	...	....	....
Oklahoma	150	750	45	....	....
Gaseous	200	...			
Pennsylvania (A)	200[4]	...	75	....	....
Pennsylvania (B)	150	...	70 to 90	60	60
Gaseous	200	...			
Tennessee	150[5]	600[5]	50	....	....
	100[6]	500[6]			
	85[7]	500[7]			
Texas	100	300	100	....	....
Utah	100	300	75	50 to 100 75 to 200[8]	....
Virginia	100	...	...	80	....
Gaseous	150				
Washington	100	500	70 to 90	60	....
West Virginia	100	...	60	80	....
Gaseous	150				
Wyoming	150	...	50	....	....

NOTE.—As often as inspector may order.
[1] In mines opened before passage of act.
[2] In mines opened after passage of act.
[3] Crosscuts in entries for air courses.
[4] In mines generating explosive gases, velocity must not exceed 450 lin. ft. per min. if gage safety lamps are used, except in main inlet or outlet airways.
[5] In mines generating firedamp.
[6] In dry and dusty mines.
[7] In non-gaseous mines.
[8] In main entry.

TABLE II. LEGAL DISTANCES SEPARATING FIRST AND SECOND MINE OPENINGS

State	Minimum No. of Men Before Two Openings Are Required	Ft. Separation of Natural Strata Required In Slope Mines	In Drift Mines	In Shaft Mines
Alabama	20	25	...	100
Arkansas	....	...	...	100
Colorado	....	...	...	300
Illinois	10	...	...	500 to 2000[2]
Indiana	10	...	...	200
Iowa	5	200	...	300
Kansas	25	80	50	80
Kentucky	10	100	50	100
Maryland	20	150	30	150
Michigan	5	200	...	300
Missouri	5	300	...	300
Montana	10	(See Note)	...	100[3]–300[4]
New Mexico	....	50	...	50
Ohio	....	100	...	100
Oklahoma	....	50	...	150
Pennsylvania (A)	....	...	...	150[5]
Pennsylvania (B)	20	150	...	200
Tennessee	20	150[3]	...	150[1]
Texas	....	....	...	150[6]
Utah	....	...	...	150[6]
Virginia	....	50	...	100
Washington	20	75	...	75
West Virginia	....	50	...	300
Wyoming	....	50	...	50

[1] In slope and shaft mines where slope is greater than 20 deg.
[2] In mines employing 10 men or less the distance between hoisting shaft and escapement shaft is to be not less than 250 ft.
[3] Where steel headframes are used.
[4] Where wooden headframes are used.
[5] Measurement given is on surface; underground the distance apart should be at least 60 ft.
[6] Not less than 30 ft. at any place.
NOTE.—Where slopes or drifts are driven in or on the coal strata, the distance apart between escapement road or travelway and the slope drift or haulingway shall be not less than 50 ft.

Mine Openings

Every state in the union in which coal mining is being carried on legally requires two openings to the surface from every seam being worked, some states stipulating that both of these openings do not necessarily have to be in the same mine, but that one of the openings may be made in some contiguous operation. The mine inspector, as in a number of other matters, is permitted to exercise his discretion as to whether the regulations be adhered to rigidly. In Table II are given data relating to the distances between first and second openings required by the laws of the state.

Refuge Holes

The laws in the majority of the coal-mining states require that refuge holes be cut on all roads where hauling is done by machinery and draft animals, and where it is necessary for men to travel. Some states merely stipulate that these refuge holes be cut where sufficient clearance does not exist between the side of the car and the face of the rib, while other states specify in detail the width, depth and height to which these shelter holes should conform. In Table III is given the legal minimum distance apart for shelter holes in mines in the states listed. Shelter holes are not required where the clearances given in Table IV obtain.

Wash-Houses

Not all the coal-mining states in the union make provision by law for wash-houses for its mine workers.

Recent amendments to old laws in some few states would seem to indicate, however, that the importance of furnishing adequate facilities for the changing of clothes and for washing up after the day's work is coming in for more recognition. As yet Alabama, Arkansas, Colorado, Iowa, Kentucky, Maryland, Missouri, New Mexico, Tennessee, Texas, Utah, Virginia, West Virginia and Wyoming have passed no law making the building of wash-houses at mines compulsory. Indiana, Michigan and Pennsylvania (anthracite) stipulate that wash-houses are to be erected upon the written request of 20 or more employees, and that where fewer than 20 are employed, then upon the written request of one-third of the number employed. Kansas goes extensively into the question of wash-houses in its mining laws, even going so far as to specify construction details and the kind of equipment to use. Montana and Ohio laws merely state that wash-houses are compulsory. Oklahoma and Pennsylvania (bituminous) operators must erect wash-houses upon the request in writing of 10 or more employees. The state of Washington requires the erection of a wash-house upon the petition of 60 per cent. of the employees at a mine, but does not enforce the law where less than 20 men are employed.

TABLE III. LEGAL DISTANCE APART OF REFUGE HOLES

State	Maximum Distance Apart, in Yds.	State	Maximum Distance Apart in Yds.
Alabama	No provision	New Mexico	100
Arkansas	....	Ohio	60
Colorado	50	Oklahoma	30
Illinois	60	Pennsylvania (A)	50
Indiana	20	Pennsylvania (B)	30
Iowa	20	Tennessee	20
Kansas	30†	Texas	No provision
Kentucky	60	Utah	150 ft.
Maryland	No provision	Virginia	80 ft.
Michigan	60	Washington	60 ft.
Missouri	No provision	West Virginia	60 ft.
Montana	20	Wyoming	No provision

† Mule haulage 60 ft.

Miscellaneous Safety Regulations

In the matter of boreholes when approaching dangerous places, the laws of the respective states show a little similarity. The differences are noted in Table V. Rules regarding the insulation and installation of electric wiring are more or less exhaustive, depending in great measure possibly on the extent of the knowledge possessed by those framing the laws. Stretchers and first-aid material are required at the mines, in all states without exception making provision for the installation of the necessary paraphernalia. Timbering of places and the precautions surrounding the handling of explosives are thoroughly gone into, but the nature of the information bearing on these subjects is such that it does not lend itself readily to tabulation. Every state makes the sprinkling of dusty mines compulsory.

TABLE IV. CLEARANCE REQUIRED ON HAULAGEWAYS WHERE MEN ARE REQUIRED TO TRAVEL

State	Distance from Side of Car to Rib, in Ft.	State	Distance from Side of Car to Rib, in Ft.
Alabama	No provision	New Mexico	2
Arkansas	No provision	Ohio	3
Colorado	3 (*a*)	Oklahoma	4
Illinois	3 (*a*)	Pennsylvania (A)	2½
Indiana	3 (*a*)	Pennsylvania (B)	(*)
Iowa	8 (*b*)	Tennessee	No provision
Kansas	No provision	Texas	No provision
Kentucky	2½	Utah	(*)
Maryland	No provision	Virginia	(*)
Michigan	3	Washington	2½
Missouri	No provision	West Virginia	(*)
Montana	2½	Wyoming	No provision

(*a*) On mechanical haulageways; where hauling is done by draft animals, 2½ ft is the distance required.
(*b*) Dimension given is width from one rib or side of the entry or haulageway to the opposite side.
(*) Of sufficient width to enable persons to pass moving cars with safety.

Insofar as possible, it would appear from an analysis of these laws that an effort should be made at standardization, wherever standardization is possible. Where a stringent law in one state puts the operator to considerable expense in the endeavor to comply with it, it is manifestly unjust that the law in an adjacent state should be lax enough to permit the operators in that state to evade the law, or to comply with the requirements at a comparatively small outlay. The cost of mining has a direct bearing on the selling price of coal, thus the states having the less restrictive laws run away with the trade of the states having laws that are more srict.

Uniformity in the regulations relating to the distance between crosscuts, or breakthroughs, is greatly needed as the legal requirements vary considerably, and in most cases the distance allowable should be increased, for the making of excessive breakthroughs is a waste of labor, adds to the expense of coal extraction and causes loss of mineral. As it weakens the support of the drawslate, it has its effect also in loss of life.

The rules were made when artificial ventilating equipment was almost unknown and when scientific methods of distributing the small amount provided by natural ventilation were crude. With canvas available in gaseous mines, with shooting done after men have left the workings, with the abolition of the foul oil torch, with an energetic current that more effectively clears the air wherever it goes, the law should direct itself less to keeping the distance between breakthroughs and develop those features which provide for the proper ventilation of the coal face.

TABLE V. REGULATIONS TO BE USED IN THE APPROACH OF DANGEROUS PLACES

State	Distance from Dangerous Places When Precautions Should Be Observed, Ft.	Width of Excavations When Approaching Dangerous Places, Ft.	Length of Center Borehole in Advance of Face, Ft.	Length of Flank Boreholes in Ft.	Distance Apart of Flank Boreholes, Ft.
Alabama	100	8	9	15	6
Arkansas	No provision	No provision	20	No provision	No provision
Colorado	No provision	8	12 (two)	12	8
Illinois	50[2]	20	10	10	On each rib
Indiana	No provision	8	9	No provision	No provision
Kansas	No provision	No provision	12	No provision	No provision
Kentucky	50[2]	No provision	12	No provision	No provision
Maryland	No provision	10	20	No provision	8
Michigan	60	8	20	15	No provision
Missouri	No provision	No provision	20	No provision	No provision
Montana	100[3]	No provision	12	12	On each rib
Ohio	100[1]	No provision	12	12	On each rib
Oklahoma	No provision	10	12	12	8
Pennsylvania (A)	No provision	12	20	No provision	No provision
Pennsylvania (B)	No provision	8	12 (two)	12	8
Utah	No provision	No provision	25	25	85
Virginia	No provision	No provision	12	No provision	No provision
Washington	No provision	8	20	12	No provision
W. Virginia	No provision	No provision	12	No provision	No provision

[1] Where there is no map, distance is 150 ft. [2] Where there is no map, distance is 100 ft. [3] Where there is no map, distance is 200 ft.

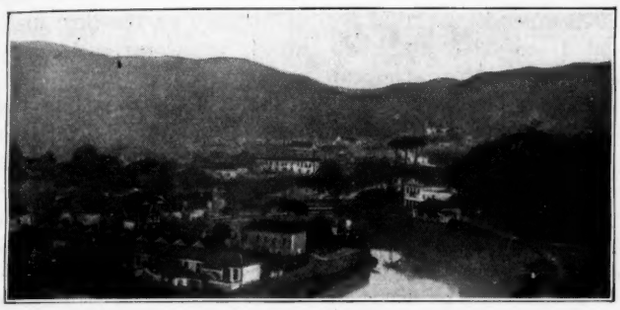
NOTE.—Iowa, New Mexico, Tennessee, Texas and Wyoming make no reference whatever to boreholes

Coal Market in South America

BY FREDERICK TODD *
New York City

THE statistics of current deliveries of coal into the existing markets of South America contain little real information concerning the possibilities now and in the future for American fuel there. Prices of coal everywhere in the large-consuming localities are obviously far from what they will be when the readjustments of ocean transportation and of international commerce become effective. There is much abnormality in the movement of coal. Nobody should attempt to judge what the future will be upon the basis of the present.

There are several big developments in progress in various places upon the continent of South America which will have their effect in the near future on the possibilities of selling foreign coals on a much



GENERAL VIEW OF BARRIA DO PIRAHY

greater scale than ever before. It may be well to mention incidentally the three developments that might seem adverse to the marketing of American coal there, before saying anything about the favorable signs.

First, and undoubtedly in the light of what data is now obtainable, the most important, is the use of petrol and of "motor spirit" derived as a byproduct from coking. There is a considerable movement in different parts of South America to use oil. In visiting a number of important manufacturing plants in Sao Paulo, Brazil, and near Buenos Aires, Argentina, where coal-gas is now used in various mechanical processes (such as in glass manufacture and enameling) I found that new apparatus was being installed for the substitution of oil to take the place of coal.

These industries are not very important, but they are typical. I was also informed by an important government official in the immediate executive charge of an extensive state railway system that it was probable that upon all new locomotives ordered or built for these roads, equipment for oil-burning would be substituted for coal. Oil and motor-spirit are right now selling at high prices in South America, but there is a feeling that even on imported fuel-oils a better organization of economies is coming.

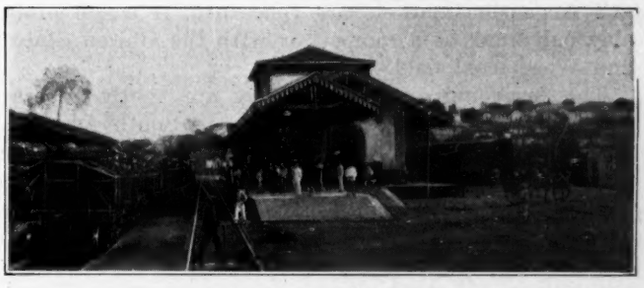
At the same time there is some prospect of local oil developments. The Rivadavia region in southern Argentina, has been developed only to the extent of scratching the surface, because, as generally said, of the government refusal to permit private exploitation on any adequate scale. Nevertheless the crude oil, lacking in certain rich elements, is now going in large quantity to the River Plate, and a great American business organization is pushing the sale of its internal-combustion machinery on the basis of the fact that this comparatively cheap fuel can be used with good success.

In addition to the Rivadavia oil, a new source of remarkably rich crude product has lately been discovered in the north of Argentina. Certain financial interests in Buenos Aires that are fully equal to the big operations involved, have taken hold of this situation. A pipe line may be laid down to Buenos Aires, or a highly interesting scheme may be adopted of transporting the oil a thousand miles by river, on barge-rafts built so that they may be broken up at the journey's end and sold for timber.

A new and important oil field is just reported as discovered in south Brazil. Another great development at first sight adverse to coal is the expectation of hydro-electric power development on an extensive scale.

The Brazilian government has just asked for plans and bids for the electrification of the "central" railway from Rio de Janeiro as far as Barria do Pirahy, a junction 68 miles out, whence government lines branch northward into the rich state of Minas Geraes, and southward into Sao Paulo. A serious proposition for an immense government steel plant at this point has been officially made but has not been adopted. Coal is now used for all traffic in the zone to be electrified, because of the mountain grades.

There is so much reliable power going to waste all through the highly developed region about Rio and Sao Paulo that there is much talk of further electrifica-



RAILROAD STATION AT LA FAYETTE, STATE OF MINAS GERAES, BRAZIL

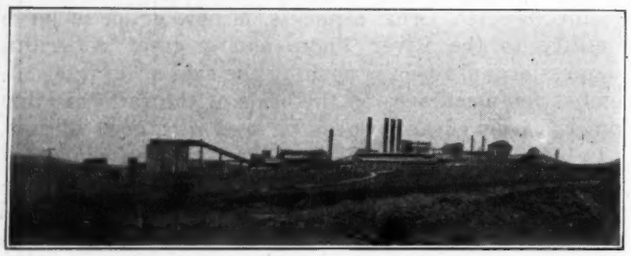
tion of railroads. These roads now burn wood altogether, except in small zones near Sao Paulo. Hydro-electric development on the Andean slopes of Chile seems also promising and almost an assured fact.

The third development that seems adverse to the sale of American coal in South America is the search for and the use of local coals. Brazil has coal fields. The output from these is now brought regularly to Rio de Janeiro. It is used in a few large industries, notably in the extensive shops of the Lloyd Brazileiro, but imported coal is mixed with it.

I took pains to seek out the opinion of capable

*Mr. Todd, who is the editor of "The Americas," the magazine of the National City Bank of New York, has recently returned from a business observation trip overland through Brazil, Uruguay, Argentina, Paraguay, Chile and Peru.

Brazilian engineers as to the future of this fuel. They say that the coal so far known in Brazil is of low grade, containing a high percentage of dirt or ash material. And the man whose judgment seemed best to me, because of his position and his accomplishments in efficient production in a great establishment, frankly stated that he would not use this fuel at all, even to



AN AMERICAN CEMENT FACTORY AT SERRAS BAJAS, ARGENTINA
Large consumers of American Coal

mix with imported coal, except for the necessity of meeting the wishes of other executives.

The concensus of opinion is that Brazilian coal can hardly compete when supplies of imported fuel begin to arrive under normal circumstances. I was forced to this opinion in spite of predilections the other way, being a great admirer of Brazil's show of enterprise in all kinds of productive development.

Coal has been found in Argentina, but I failed to meet anybody at Buenos Aires who took the Argentine coal prospects with much seriousness. There is coal also in Chile, and it is said to be of good quality. My stay in Chile was too brief (owing to delay in the Andes crossing) to satisfy myself just why more is not being done to develop this supply, and to develop industries to take advantage of it.

There is good coal in Colombia, and if the supply is developed, it may feed manufacturing industry, also railroads, along the Carribean coast. It even may constitute the source of supply for the coaling stations at the Panama Canal. As far as the Brazilian and Argentine markets are concerned, it would probably only rank as a competitor with the United States and Welsh coal field.

The foregoing are developments apparently adverse to the marketing of American coal in South America. In reality, all would probably assist in making the market greater. Cheap motor fuel supplied will without doubt be absorbed in a big development of bonanza farming, from Patagonia up to the far limits of Mato Grosso in Brazil and of the vast Chaco of Paraguay and Bolivia. If cheap electric power ever enables Brazil to secure cheap transportation through the rich country of Minas Geraes, Sao Paulo, South Brazil, and on the projected lines into the great cattle country of Mato Grosso and into Paraguay, so great a general growth of prosperity will follow as to require vastly increased supplies of coal for various purposes.

There is even now, an important growth of manufacturing industry in Brazil, Uruguay, and Argentina. It is well organized, efficient manufacturing industry that needs coal.

Everywhere, better railroad transportation is demanded. There are extensive regions where it will never be possible to use hydro-electric power.

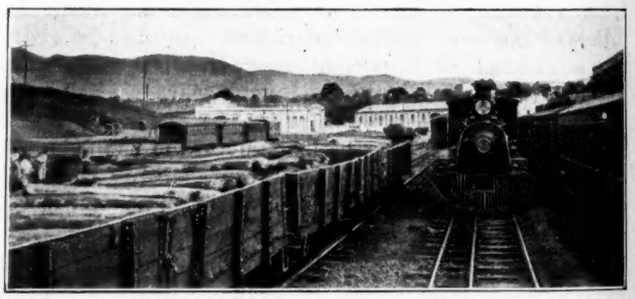
At present, the chief fuel of all South America is wood. Nobody who has been brought up in the United States can realize, until he sees it with his own eyes, how wood figures as fuel in coalless countries in this age. For hundreds of miles, along the South American railways, one sees the great stacks of firewood, literally lining the rights of way. It is brought for miles, by ox teams, down the hills and across country. Here and there spurs of railway run off as side tracks to tap a supply of wood. Gathering and hauling wood seem to use up a high proportion of the energies of the inhabitants along the railways and of the railways themselves.

The locomotive tenders are piled high with wood, but the train must wait 15 to 20 min. at intervals when stops are made in order to replenish supplies. On side-tracks long trains of wood-cars are waiting enroute to the cities. Wood comes down river on barges and steamers, and on lumber rafts in vast quantities.

But South America has already burned up the forests adjacent to the larger cities. It is becoming a problem where the wood-fuel of the future is to be obtained. The vast forests of Brazil, on the Amazon, are inexhaustible for perhaps a thousand years, but they are 2,000 miles away from Rio de Janeiro as the bird flies, and from 3,000 to 4,000 miles, by water. Already, the forests along the rail lines have receded.

Buenos Aires has a large supply of firewood in the artificial forests that line the banks and cover the islands of River Plate for 50 miles upstream. The eucalyptus and other trees of rapid growth, are cultivated in a systematic way on stretches of flat land, laid out in squares bounded by irrigation ditches, with straight trees growing in mile-long rows only a few feet apart. The wood is cut in blocks, as it reaches cutting maturity. As seen by the voyager coming down by steamer from Asuncion, this is an impressive industry. Corporations operate the industry, some sections being owned by *frigorifico* companies that cultivate fuel for their own factories, other by companies that sell the wood in Buenos Aires.

Now wood is becoming dear in price, owing, some say, to a scarcity. Even in the country towns, wood sells for the equivalent of $5 and $6 a cord, and the



CARS LOADED WITH WOOD USED AS FUEL AT LAFAYETTE, MINAS GERAES, BRAZIL

statement is made that the firewood piles owned by glass factories, etc., in Buenos Aires cost them as much as coal would have cost, even in war-time, unit for unit in value as fuel.

There can be little doubt that South American cities will soon offer a large demand for high-grade domestic coals if the market is developed and prices are right. The railroads must soon find wood as a fuel not only unsatisfactory, but much costlier than coal on a peace basis. And the hundreds of important industries now springing up will surely be attracted by offers of coal at prices based upon normal transportation conditions.

Southern West Virginia in the Year Past

By Josiah Keely
Kayford, W. Va.

ANY summary of the coal business of southern West Virginia cannot be complete without the records of the mines on the Kanawha & Michigan, the Norfolk & Western, and the Virginian. The mines on the Chesapeake & Ohio, however, comprising the Kanawha, New River, Guyan River, Coal River and part of the Big Sandy valleys, combine to make such a large field that its history will give a fairly accurate résumé of what has happened in 1919 in southern West Virginia.

The signing of the armistice in the latter part of 1918 began to show its effect in January of 1919, and from then until well into June the low tonnage was a reflection of poor business. However, the difference between the spring of 1919 and the preceding one was not so much as might be supposed. During the first six months of 1918 the Chesapeake & Ohio handled 14,000,000 tons while during the same period of 1919 it hauled 12,500,000 tons, or during the whole of 1918 there were 29,000,000 tons loaded as compared with 27,000,000 tons in 1919, so the loss of two million tons seems to have almost entirely come about in the first six months, in spite of the car shortage during August and September, and the strikes in November and December of 1919.

In July of 1918 the Chesapeake & Ohio broke all previous records by hauling a little over three million tons. This was done under the stress of a war drive. In October of 1919, the output, sustained by the anticipation of the November strike, was only a few tons under this figure. The exact figures were 3,129,950 and 3,123,090 respectively. It is worthy of note that this railroad was serving 485 mines in 1918 and 512 in 1919, an increase of 27 mines since war times.

Southern West Virginia came somewhat well through the stringency of the spring months. A fall of only one-and-half million tons, or about 10 per cent occurred along the Chesapeake & Ohio during the first half year, and, in the year as a whole, despite the strike the tonnage was only two million tons below that of 1918. Even during the war it was hard to find a month better than October of last year. Union men left the union fields during the strike and went to the Guyan field where steady work was obtainable.

The following table gives the distribution of the coal routed over the Chesapeake & Ohio from southern West Virginia in 1919:

CHESAPEAKE & OHIO LOADING FOR THE YEAR OF 1919

(In Tons)

Month	New River	Kanawha	Coal River	Logan	Kentucky	Unalloted	Total
Jan....	451,810	453,280	151,610	595,220	237,190	174,800	2,063,910
Feb.....	325,140	338,010	88,390	370,350	160,030	155,500	1,437,420
March.	415,800	367,590	125,340	450,940	194,880	181,550	1,736,100
April...	523,460	414,430	129,570	567,210	205,790	163,400	2,003,860
May...	624,360	523,010	195,580	786,760	255,370	166,000	2,561,080
June...	634,970	563,130	216,660	896,220	268,900	161,500	2,741,380
July...	631,170	571,850	218,770	949,340	304,170	192,250	2,867,550
August.	470,160	396,590	158,140	631,250	224,160	136,200	2,016,500
Sept....	470,910	478,520	186,560	755,560	239,250	158,300	2,289,100
Oct....	655,850	632,880	234,430	997,450	378,430	224,050	3,123,090
Nov....	314,770	260,320	115,630	977,660	251,640	165,900	2,085,920
Dec.*..	387,370	212,900	126,560	724,980	261,450	171,650	1,884,900
Total.	5,905,770	5,212,510	1,947,240	8,702,940	2,981,260	2,051,100	26,810,810

*Up to and including December 24th.

Following down each column the tonnage is a fair index to the history of each district. Down through January, February, March, April and May was when the railroads and the public were holding off for cheap fuel. The break in prices came after this economic war, and everybody began loading coal. June and July sufficed to overtax the car capacity, and the car shortage cut down the tonnage in August and September. In August, New River and Kanawha, which have nearly the same allotment, show a difference in loading of 70,000 tons, representing just that much inequality in car distribution. However, this was being made up to the Kanawha Field in September, when a rather unusual thing happened. First, Labor Day was a loss and then on Sept. 5, by a preconcerted agreement, all mines in Kanawha, Cabin Creek and Coal River were shut down two or three days as a protest against the unorganized field of Guyan.

The men met with arms, and ammunition and uniformed in new overalls. In spite of the warning of Governor Cornwall a body numbering a thousand or more marched toward Guyan. This advance was only stopped when two messages were received simultaneously—one from the Governor and one from the armed deputies and men of Guyan who had a large army of scouts and 50 automobiles full of special officers waiting for them. It is a matter of some speculation which one of the messages were most heeded, but the invading army returned. A little later another attempt was made to get up an army for Guyan, but the only result was more loss of coal in the Kanawha field in September.

In October a rush was made in all fields to lay by supplies for the strike called Nov. 1. This resulted in the biggest month of the year.

During November and December the table shows the effect of the strike order in the various fields. New River and Kanawha at first showed almost complete suspension. The Logan field of Guyan was not effected. In fact, many of the miners from the union fields crowded in and filled up these mines. But for car shortage Guyan would probably have broken its record of July, 1918.

On Nov. 11, the miners received the order to return to work, but as anticipated, it did not seem to have been given in the right tone of voice. Illustrating, a driver can say "get up" to a mule in an impersonal, conversational way, and the mule does not even hear it; but when the driver wants him to really "get a move on," he says the same words with a different inflection. That seems to be about what happened in the case of the strikers. Occasionally a mule is listening for the word to go, especially if he happens to be headed in the right direction. A considerable number of mines, especially on New River, seemed to be listening. Any-

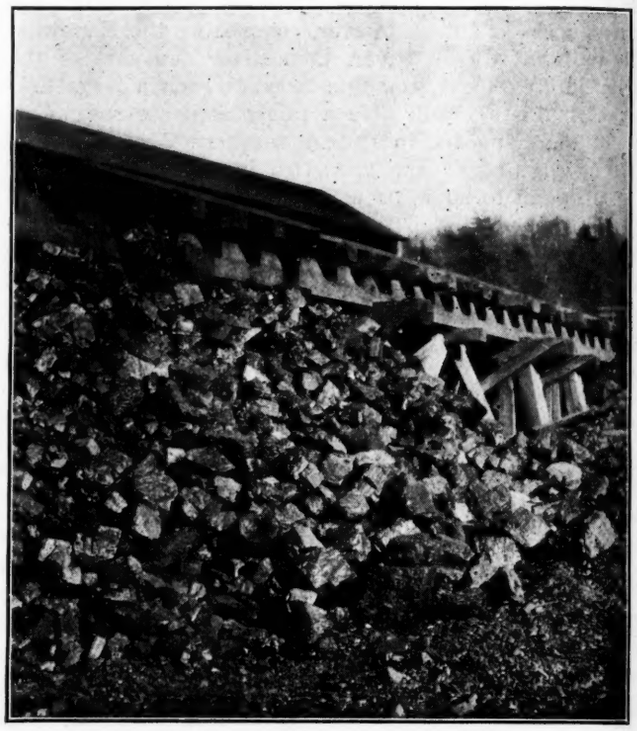
way, New River worked better than Kanawha. In fact, all the southern districts did better than Kanawha on the order to resume work.

However, most of the mines finally started and coal was moving again until the Garfield settlement was announced about Thanskgiving time. This seems to have been a signal for another general suspension, lasting, except on New River, until the Palmer interpretation held out hopes for a reconsideration, which put Kanawha and the rest to work about Dec. 13.

In two or three days the field was hit with such a car shortage that not quite as much coal was loaded as when the men were striking, for Guyan could load during the strike but seemed helpless against the car shortage. The Chesapeake & Ohio records seem to indicate that this road has offered southern West Virginia 270.27 days' work this year. It further shows that the mines have only availed themselves of 169.23 days. By a simple mathematical calculation it can be shown that this region has lost 101.04 days in strikes and failure to load. However, in looking over the records, by some strange coincidence, the days on which the mines and the miners want to work are the very days when there are no cars, and, when there is a 100 per cent car supply, there is either a strike of miners, or a strike of buyers in progress. This has happened with such regularity that among the more suspicious of us there is a feeling that transportation is such a limiting factor that it makes little difference whether we strike or work. In corroboration of this, the Chesapeake & Ohio last year with all sails set, and the nation clamoring for coal to win the war, was able apparently to handle only two million tons, or a partial month's run, more in 1918 than in 1919, the first part of which nobody was ordering and the last part the men were striking.

No, the railroads can not offer cars for 270 days in the year at present, and thus, regardless of any annual summary reciting causes of non-performance, we may be sure that the history of transportation is now the real history of the coal business.

WEST VIRGINIA MINE-RUN COAL FOR LOCOMOTIVE USE



LOCOMOTIVE FUEL FROM THE KANAWHA FIELD

Oklahoma Wage Scale

Below are tables showing the wage scales in effect during the year in the southern and northern fields and the selling prices of the various grades of coal at the mines. The operators have granted the 14 per cent wage increase, as made a condition of the strike settlement.

WAGE SCALE IN EFFECT IN 1919

(Southern Field)

(a)	Miner (pick work)	78, 83 and 99 cents per ton
(b)	Driver	$5.25 to $5.40 per day
(c)	Timberman	5.25 to 5.30 per day
(d)	Laborer	5.25 per day (underground)
	Laborer	4.40 per day (surface)

PRICES PAID FOR COAL AT THE MINES, 1919

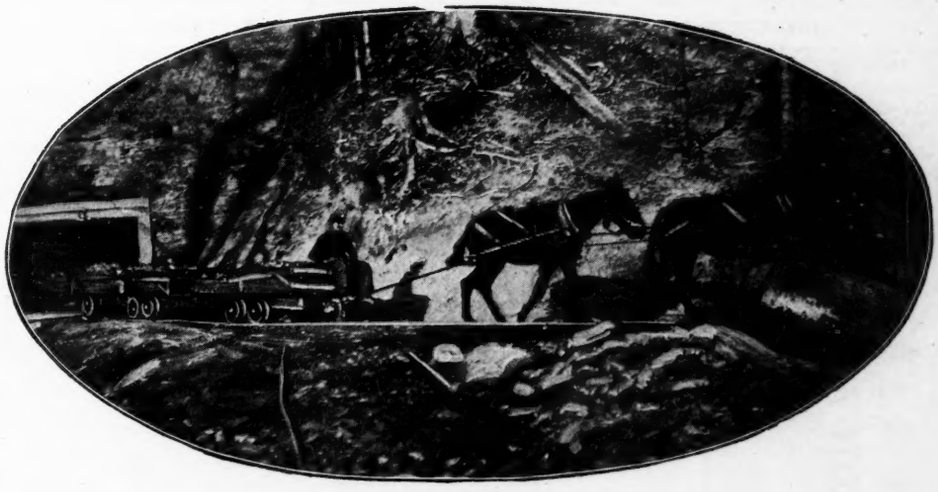
(a)	Lump	$3.60 to $4.50 per ton
(b)	Nut	3.10 to 4.25 per ton
(c)	Slack	1.60 to 2.00 per ton
(d)	Mine Run	2.60 to 2.70 per ton

(Northern Field)

(a)	Miner	57½ and 62 cents per ton (machine)
	Miner	78 and 79 cents per ton (pick work)
(b)	Driver	$5.45 to $5.50 per day
(c)	Timberman	5.46 to 5.50 per day
(d)	Laborer	5.46 to 5.50 per day (underground)
	Laborer	4.76 per day (surface)

PRICES PAID AT MINES, 1919

(a)	Lump	$3.60 per ton
(b)	Slack	1.35 per ton
(c)	Mine Run	2.60 per ton



Fusibility of the Ash from Certain Eastern Coals*—I

By W. A. Selvig, O. C. Brown and A. C. Fieldner
Fuels Chemical Laboratory, Bureau of Mines, Pittsburgh, Penn.

THE Eastern coal province, which includes the anthracite regions of Pennsylvania and Rhode Island, the Atlantic Coast region of Virginia and North Carolina, and the great Appalachian region, contains the best known and most extensively mined coals in the United States.

Previous papers[1] gave a description of the standard gas-furnace method used by the Bureau of Mines in making ash fusibility tests, a discussion of the relation of fusibility tests to clinker formation, and complete tables giving results obtained for West Virginia, Pennsylvania and Mid-Continent coals. This paper includes a table giving the results obtained for all coals tested from the remaining states of the Eastern coal province and includes coals from Ohio, eastern Kentucky, Virginia, Maryland, Tennessee and Alabama. No coals from Rhode Island, North Carolina or Georgia are represented. The states of Rhode Island and North Carolina are of little commercial importance as coal producers.

Interpretation of Fusibility Table.

The samples represented are standard mine samples collected by representatives of the Bureau of Mines, the U. S. Geological Survey, or by the various state geological surveys, according to the methods used by the Bureau of Mines.[2]

The arrangement in the table of the coals tested from each state is alphabetical according to bed, county, town and mine. The number of samples from each mine, the lowest, highest and average softening temperatures in degrees Fahrenheit, and the per cent of ash and sulphur in the dry coal are tabulated for each mine tested. Average values for each mine were computed from the individual samples, and from these values averages representing each bed were obtained. It is evident that the greater the number of mines sampled the more representative are the average values for the beds. This should be kept in mind, as in many instances the average values given for the beds represent only a few mines and are then not truly representative of the coal bed.

Definition of Fusibility Temperature

The point taken as the softening temperature is that at which the ash when molded into solid triangular pyramids ¾ in. high and ¼ in. wide at the side of the base, and mounted in a vertical position, has fused down to a spherical lump. Samples remaining unfused at 3010 deg. F., which was the highest temperature attained in the test, were marked plus 3010 (+ 3010), and used as such in figuring the average values for the mine from which the average values of the beds were computed.

For convenience in discussion, the order of fusibility of coal ash from the various coals of the country may be divided into three groups as follows: Class 1—refractory ashes, softening above 2600 deg. F. Class 2—ashes of medium fusibility, softening between 2200 and 2600 deg. F. Class 3—easily fusible ashes softening below 2200 deg. F.

The coals of Ohio which were tested gave ash of medium fusibility; the average values of the different beds come mainly in class 2. The softening temperature of the coals of eastern Kentucky and Virginia cover a wide range of fusibility from readily fusible ashes coming in class 3, to refractory ashes coming in class 1. Many of the coal beds of Maryland which are represented give coal having a refractory ash coming in class 1 or in the upper part of class 2. The coals tested from Tennessee and Alabama come mainly in class 2, giving ash of medium fusibility, though both class 1 and class 3 are represented.

*Published by permission of the Director, U. S. Bureau of Mines.

[1]Selvig, W. A.; "Fusibility of West Virginia Coal Ash," *Coal Age*, Vol. 15, No. 1, 1919, pp. 12-16.
Selvig, W. A., and Fieldner, A. C.; "Fusibility of Ash from Pennsylvania Coals," *Coal Age*, Vol. 15, No. 24, 1919, pp. 1086-1089.
Selvig, W. A., Ratliff, W. C., and Fieldner, A. C.; "Fusibility of Ash from Coals Found in the Interior Province," *Coal Age*, Vol. 15, No. 16, 1919, pp. 698-703.

[2]Holmes, J. A.; "The Sampling of Coal in the Mine," Technical Paper 1, Bureau of Mines, 1911, 18 pp.

TABLE OF SOFTENING TEMPERATURES OF COAL AS FROM EASTERN COALS

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7
VIRGINIA—Continued								
Glamorgan Bed								
County	Town	Mine						
Wise	Glamorgan	Glamorgan No. 3	2	2130	2190	2160	5.86	1.22
Imboden Bed								
Wise	Dooly	Intermont No. 6	2	2540	2640	2590	10.25	0.90
Wise	St. Paul	Twin City No. 1	1	....	....	2240	12.69	2.22
Average of mines in Imboden Bed			3			2420	11.47	1.56
Jawbone Bed								
Wise	St. Paul	Twin City No. 3	1	....	....	2240	19.86	1.03
Kennedy (Widow Kennedy) Bed								
Dickenson	Nora	Nora Mills	2	2130	2260	2200	9.79	0.74
Russell	Dante	Clinchfield No. 103	1	....	....	2220	7.64	1.83
Russell	Della	Flat Rock	2	2090	2160	2130	9.58	0.84
Russell	Drill	Drill	1	....	....	2230	6.94	1.03
Russell	Drill	Sandy Ridge	2	2070	2220	2150	5.81	1.00
Average of mines in Kennedy (Widow Kennedy) Bed			8			2190	7.95	1.09
Large Bed								
Montgomery	Blacksburg	Plunkett & Wall	1	....	....	+3010	18.06	0.52
Montgomery	Blacksburg	Seymour-Price	1	....	....	2960	19.34	0.59
Montgomery	Blacksburg	Slusser	3	2360	2440	2410	17.55	0.60
Montgomery	Christiansburg	Lyken Hill	1	....	....	+3010	22.70	0.72
Pulaski	Parrott	Parrott	1	....	....	3010	23.28	0.69
Average of mines in Large Bed			7			+2880	20.9	0.62
Little Bed								
Montgomery	Merrimac Mines	Merrimac Prospect	1	....	....	+3010	21.29	0.49
Little Town Hill Bed								
Tazewell	Richlands	East	2	2390	2500	2440	8.40	0.56
Lower Banner Bed								
Russell	Dante	Clinchfield	1	....	....	2350	6.59	0.66
Russell	Dante	Clinchfield No. 52	4	2110	2290	2180	6.61	0.69
Russell	Wilder	Clinchfield No. 55	3	2200	2450	2320	5.92	0.82
Average of mines in Lower Banner Bed			8			2280	6.37	0.72
Lower Bolling Bed								
Wise	Flat Gap	Reuben Bolling	1	....	....	2720	8.74	1.12
Meadow Bed								
Tazewell	Richlands	Richlands No. 2	2	2300	2660	2480	12.92	0.62
Milner Bed								
Scott	Ka	Milner Prospect	1	....	....	2120	5.89	1.69
Mohawk Bed								
Buchanan	Blackey	Blackey	2	2060	2260	2160	3.49	1.32
No. 4 Bed								
Russell	Slemp	Clinchfield No. 201	3	2160	2200	2180	6.58	0.99
Pardee (Parsons) Bed								
Wise	Pardee	Pardee No. 1	2	2420	2500	2460	8.04	1.59
Pocahontas No. 3 Bed								
Tazewell	Boissevain	Big Vein No. 2	2	2410	2500	2460	4.40	0.60
Tazewell	Boissevain	Boissevain	14	2030	2560	2270	4.05	0.51
Tazewell	Pocahontas	Baby	3	2490	2580	2530	4.33	0.53
Tazewell	Pocahontas	Big Vein No. 1	5	2380	2640	2520	3.98	0.62
Tazewell	Pocahontas	West	4	2190	2500	2320	4.52	0.46
Average of mines in Pocahontas No. 3 Bed			28			2420	4.26	0.54
Pocahontas No. 5 Bed								
Tazewell	Faraday	Altizer	1	....	....	2090	5.19	0.82
Red Ash Bed								
Tazewell	Red Ash	Raven Red Ash	2	2230	2240	2240	5.96	0.64
Small Bed								
Montgomery	Blacksburg	Clements Hollow	1	....	....	+3010	42.98	0.34
Splash Dam Bed								
Dickenson	Mart	Owen's	2	2690	2750	2720	5.77	0.65
Upper Bed								
Pulaski	Dublin	Cloyd	1	....	....	+3010	24.23	0.42
Wyth	Max Meadows	Ellison & Johnson Prospect	1	....	....	+3010	35.20	0.34
Average of mines in Upper Bed			2			+3010	29.72	0.38
Upper Banner Bed								
Dickenson	Prater	Yellow Poplar	2	2430	2630	2530	7.02	1.08
Russell	Dante	Clinchfield No. 2	8	2080	2320	2210	6.88	0.63
Russell	Dante	Clinchfield No. 3	3	2200	2570	2350	7.88	0.63
Russell	Wilder	Clinchfield No. 6	3	2260	2360	2300	5.86	0.57
Wise	George I	Swansea	1	....	....	2520	5.65	0.53
Wise	Tom's Creek	Cranesnest No. 1	2	2510	2660	2580	5.28	0.55
Average of Upper Banner Bed			20			2420	6.43	0.67
MISCELLANEOUS (Coal beds not identified) BEDS								
Buchanan	Big Rock	Oliver Elswick	1	....	....	+3010	7.23	0.69
Buchanan	Whitewood	Whitewood	1	....	....	+3010	13.74	0.73
Lee	Pockett	Reed Creek Coal Ass'n	2	2140	2250	2200	9.14	3.59
Pulaski	Max Meadows	Summit	1	....	....	3010	25.59	0.78
Russell	Della	Jackson	1	....	....	2070	12.96	0.96
Scott	Adamar	Hagan	1	....	....	2530	29.61	1.01
Tazewell	Bandy	Christian	1	....	....	2360	4.15	1.03
Tazewell	Bandy	Patrick	1	....	....	2260	3.67	1.14
Tazewell	Jewell	Jewell Ridge No. 1	2	2500	2640	2570	5.94	0.78
Wise	Norton	Norton No. 4	1	....	....	2600	3.89	0.93

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM EASTERN COALS

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7
EASTERN KENTUCKY—Continued								
Fire Clay (Dean, or No. 4) Bed								
County	Town	Mine						
Bell	Fourmile	East Jellico	2	2910	+3010	+2960	7.92	1.02
Bell	Fourmile	Magnet	3	2440	2910	2650	6.71	1.10
Knox	Bradel	Bennett No. 1	3	2840	2960	2910	6.42	0.78
Perry	Douglass	Douglass	4	2620	+3010	+2860	3.55	0.74
Perry	Hazard	Hazard	3	2910	+3010	+2940	3.64	0.63
Perry	Hazard	Hazard-Dean	2	2370	2460	2420	4.12	0.86
Perry	Hazard	Ross Petrey	1	....	....	+3010	6.16	0.68
Perry	Lennut	North Fork	4	2630	+3010	+2900	4.24	0.87
Perry	Lothair	Ashless	3	2320	2610	2490	5.39	0.67
Average of mines in Fire Clay (Dean or No. 4) Bed			25			+2790	5.35	0.82
Flag (No. 7) Bed								
Perry	Lothair	Kentucky Jewel	4	2730	2970	2880	7.52	0.83
Harlan Bed								
Harlan	Harlan	Clover Fork	3	2510	2930	2720	2.95	0.75
Harlan	Harlan	Coxton	2	2520	2550	2540	3.52	0.88
Harlan	Harlan	Wood	3	2600	+3010	+2840	5.36	0.92
Average of mines in Harlan Bed			8			+2700	3.94	0.85
Hazard (Haddix, or No. 6) Bed								
Perry	Domino	Himyar	4	2020	3010	2460	8.56	0.79
Hickory Bed								
Bell	Rim	Rim No. 4	4	2020	2490	2340	5.37	1.07
Jellico Bed								
Knox	Elys	New Hughes	4	2360	2590	2460	6.92	1.56
Kellioka (C) Bed								
Harlan	Benham	Benham	1	....	....	2230	2.21	0.49
Lower Bolling Bed								
Letcher	Flatgap	Mullin	1	....	....	2880	11.65	1.01
Lower Hignite Bed								
Bell	Chenoa	Chenoa Hignite	3	2370	2500	2440	4.57	1.10
Lower Standiford Bed								
Letcher	Flatgap	Local	1	....	....	2260	5.24	1.81
Mason Bed								
Bell	Chenoa	Log Mountain No. 1	4	2140	2390	2250	2.53	0.85
Bell	Colmar	Armu	3	2240	2390	2330	6.09	1.61
Bell	Tejay	Tejay	4	2320	2430	2390	3.18	0.97
Average of mines in Mason Bed			11			2320	3.93	1.14
Miller Creek (No. 1) Bed								
Johnson	Van Lear	Van Lear No. 1	2	2010	2280	2150	3.50	1.17
Johnson	Van Lear	Van Lear No. 2	1	....	....	2030	3.54	1.90
Johnson	Van Lear	Van Lear No. 3	1	....	....	2080	3.49	1.54
Johnson	Van Lear	Van Lear No. 4	1	....	....	2400	2.46	0.68
Laurel	East Barnstead	Bonar	4	2020	2460	2220	4.97	2.40
Laurel	Pittsburgh	Acme	4	1990	2120	2060	7.39	3.70
Average of mines in Miller Creek (No. 1) Bed			13			2160	4.23	1.90
Popular Lick Bed								
Bell	Harrison	Log Mountain No. 52	4	2440	2960	2670	5.30	1.05
Rawl (Gas, or No. 2) Bed								
Pike	Sprig	Burnwell No. 2	1	....	....	+3010	5.25	0.64
Whitley	Barthell	No. 1 (North Main)	1	....	....	2340	9.80	3.16
Average of mines in Rawl (Gas, or No. 2) Bed			2			+2680	7.53	1.90
Straight Creek Bed								
Bell	Arjay	Glendon	4	2100	2130	2110	3.12	0.90
Bell	Fox Ridge	Fox Ridge	4	1970	2070	2010	1.98	1.07
Bell	Kettle Island	Pioneer	4	1990	2380	2170	4.85	1.38
Bell	Straight Creek	Barker No. 2 and 3	4	2110	2170	2140	3.66	1.33
Average of mines in Straight Creek Bed			16			2110	3.40	1.17
Thacker Bed								
Pike	Thacker	Little Thacker	1	....	....	2430	4.42	1.39
Upper Hance Bed								
Bell	Varilla	Varilla	4	2150	2550	2330	4.74	1.61
VIRGINIA								
"B" Bed								
Henrico	Gayton	Carbon Hill	1	....	....	2420	17.73	2.21
Big Bed								
Montgomery	Blacksburg	Slusser	1	....	....	2260	15.64	0.56
Montgomery	Merrimac Mines	Merrimac	1	....	....	2650	20.07	0.48
Pulaski	Parrott	Parrott	1	....	....	2350	23.97	0.68
Average of mines in Big Bed			3			2420	19.89	0.57
Big A No. 2 Bed								
Tazewell	Seaboard	Empire No. 6½	2	2310	2320	2320	6.34	0.60
Big Town Hill Bed								
Tazewell	Richlands	West	2	2190	2290	2240	11.84	0.48
"C" Bed								
Henrico	Gayton	Carbon Hill	2	2160	2250	2210	10.26	1.40
Clintwood Bed								
Dickenson	Clintwood	Yeates	1	....	....	2670	3.26	0.87
Duncan Bed								
Scott	Ka	Hagan Prospect	1	....	....	2160	6.65	0.88

TABLE OF SOFTENING TEMPERATURES OF COAL ASH FROM EASTERN COALS

Locality, Bed, Etc.			Number of Samples from Mine	Softening Temperature, Deg. F.			Average Analysis of Dry Coal, Percentage of	
				Lowest	Highest	Average	Ash	Sulphur
1			2	3	4	5	6	7
OHIO								
Anderson (Bakerstown) Bed								
County	Town	Mine						
Guernsey	Hartford	Andy Slovak	1	....	....	2120	10.86	3.92
Lower Freeport Bed								
Columbiana	East Liverpool	Kinsey	1	....	....	2300	10.86	4.66
Columbiana	East Liverpool	Moore	1	....	....	2470	12.16	3.18
Columbiana	Wellsville	Scheckler	1	....	....	2520	12.25	1.58
Jefferson	Amsterdam	Amsterdam	4	2060	2190	2120	7.66	3.03
Jefferson	Amsterdam	Eastern Ohio	3	2050	2260	2150	9.12	2.92
Jefferson	Amsterdam	Elizabeth	3	2120	2210	2170	7.91	3.12
Jefferson	Steubenville	La Belle	1	....	....	2300	7.71	1.99
Noble	Belle Valley	Noble	2	2130	2350	2240	8.71	3.13
Average of mines in Lower Freeport Bed			16			2280	9.55	2.95
Lower Kittanning Bed								
Columbiana	East Liverpool	Malone	1	....	....	2400	11.94	8.25
Columbiana	Wellsville	Ainsworth	1	....	....	2060	5.18	3.68
Columbiana	Wellsville	Wooster	1	....	....	2060	8.92	5.87
Jefferson	Irondale	East Ohio No. 2	1	....	....	1960	10.90	5.07
Average of mines in Lower Kittanning Bed			4			2120	9.24	5.72
Mahoning Bed								
Columbiana	Wellsville	Dangel	1	....	....	2040	6.59	3.67
Meigs Creek (Sewickley) Bed								
Belmont	Alledonia	Shipman	1	....	....	2060	18.46	4.20
Belmont	Barnesville	Davy	1	....	....	2490	11.72	3.82
Noble	Mount Ephraim	Wiley Carter	1	....	....	2320	10.81	4.32
Noble	Quaker City	Griffin	1	....	....	2460	13.17	3.77
Noble	Steamtown	Moore	1	....	....	2310	10.92	5.05
Average of mines in Meigs Creek Bed			5			2330	13.02	4.23
Middle Kittanning Bed								
Columbiana	East Liverpool	Delaney	1	....	....	2430	4.82	1.53
Columbiana	East Liverpool	Duck	1	....	....	2220	6.31	2.18
Columbiana	East Liverpool	Johnson	1	....	....	2600	7.80	1.88
Columbiana	East Liverpool	Smith	1	....	....	2420	6.51	2.72
Columbiana	Wellsville	Wooster	1	....	....	2600	11.13	0.72
Jefferson	Cream City	Cream City	1	....	....	2410	11.45	2.13
Average of mines in Middle Kittanning Bed			6			2450	8.00	1.86
Pittsburgh, (No. 8, Bed								
Belmont	Bailey Mills	Cochran No. 2	2	1960	1960	1960	9.35	4.64
Belmont	Temperanceville	Jeffries	1	....	....	2260	9.86	4.75
Guernsey	Quaker City	Sayre	1	....	....	2180	9.14	5.07
Jefferson	Brilliant	Goucher No. 2	2	2170	2190	2180	8.04	3.94
Jefferson	Empire	Culp	1	....	....	2150	9.67	4.15
Jefferson	Hopedale	Parlett	2	2160	2250	2210	8.11	2.91
Jefferson	Piney Fork	Piney Fork No. 1	1	....	....	2120	7.62	2.73
Jefferson	Piney Fork	Piney Fork No. 2	2	2630	2710	2670	5.33	0.85
Jefferson	Smithfield	Plum Run No. 5	1	....	....	2160	7.26	2.68
Jefferson	Yellow Creek	....	1	....	....	2170	10.34	4.08
Average of mines in Pittsburgh Bed			14			2210	8.47	3.58
Uniontown Bed								
Belmont	Hunter	Kemp	1	....	....	2160	16.10	2.99
Monroe	Coats Station	Mobley	1	....	....	2290	16.10	4.16
Average of mines in Uniontown Bed			2			2230	16.10	3.58
Upper Freeport (No. 7) Bed								
Columbiana	East Liverpool	Gaston	1	....	....	2050	9.44	4.23
Columbiana	New Salisbury	McClain	1	....	....	2030	11.32	4.43
Columbiana	Wellsville	Householder's	1	....	....	2440	8.73	3.98
Columbiana	Wellsville	Smith	1	....	....	2400	7.75	2.96
Columbiana	West Point	West Point	1	....	....	2240	8.29	3.79
Guernsey	Hartford	Waldhoning No. 2	2	2460	2570	2520	5.91	0.92
Guernsey	Lore City	Black Top	2	2280	2300	2290	7.92	2.01
Guernsey	Senecaville	Cleveland	2	2330	2460	2400	8.43	2.02
Jefferson	Irondale	Nicholson	1	....	....	2210	8.82	2.98
Jefferson	Yellow Creek	Yellow Creek	2	2140	2330	2240	8.22	3.54
Average of mines in Upper Freeport Bed			14			2280	8.48	3.09
Washington Bed								
Belmont	Alledonia	Moore	1	....	....	2520	21.90	2.98
Waynesburg Bed								
Belmont	Alledonia	Stoffel	1	....	....	2390	15.14	2.71
Belmont	Boston	Thomas	1	....	....	2370	15.44	3.16
Belmont	Hunter	Milhoan	1	....	....	2370	16.95	3.69
Belmont	Somerton	Brown	1	....	....	2460	16.15	3.03
Average of mines in Waynesburg Bed			4			2400	15.92	3.15
EASTERN KENTUCKY								
Alum Bed								
Pike	Thacker	Little Thacker	1	....	....	2940	4.37	0.61
Elkhorn Bed								
Letcher	Fleming	Acme	2	2300	2390	2350	3.18	0.68
Letcher	Fleming	Elkhorn No. 301	4	2550	2640	2590	4.18	0.64
Letcher	Jenkins	Consolidation No. 204	2	2490	2660	2580	5.24	0.53
Letcher	Jenkins	Local	1	....	....	2520	3.92	0.86
Letcher	McRoberts	Consolidation No. 213	4	2350	2670	2500	3.42	0.56
Letcher	McRoberts	Consolidation No. 214	4	2430	2730	2540	3.79	0.60
Letcher	Mater	Elkhorn or Kona	4	2390	2510	2450	4.6	1.02
Pike	Hellier	Edgewater	1	....	....	2260	2.75	0.98
Average of mines in Elkhorn Bed			22			2470	3.83	0.68

Coal Mining in Utah During 1919

By A. C. Watts
Salt Lake City, Utah

SYNOPSIS — *Production in Utah declined, but not as much as in other states, because the mines operated during the strike, relieving the difficulties over large areas of the West where the strike made severe coal shortages. Utah pays large compensation rates, and as a result the state is laying aside a large fund for the protection of employees. The National Government sold 329 acres of coal land. Title to school coal lands needs clearing by Federal enactment. Taxation is now based on coal-land valuation.*

THE coal-mining industry of Utah began the year 1919 with a most discouraging outlook. The market for the product of its coal mines promised to be unusually limited. A serious slump occurred in the demand for coal, when the armistice was signed in November, 1918; for with the war at an end there was a general curtailment of operations at all the metal mines, smelters and other industries in the territory served by Utah coal. A mild winter, which reduced consumption of domestic fuel below normal, added to the difficulty.

The railroads, smelters, industrials, domestic dealers and consumers carried over good stocks from 1918, and there could be no hope of much improvement in general demand until these reserve stocks were at least partially depleted. This gloomy outlook in the early part of the year caused all the coal operators in Utah to materially reduce their working forces in the hope that the men remaining might be given sufficient work to maintain themselves in reasonable well-being. The operators not only reduced their working forces but also limited development work in the mines and stopped all except absolutely necessary improvements.

By decreasing the number of their employees the operators were enabled, after the first week in January, to work more steadily, though the production was not so large as before. These conditions prevailed until about June, when the manufacturing industries and metal mining began to show signs of increased activity and when domestic and industrial storage was resumed.

The wisdom of storing coal, during the late spring and summer months, for use in the winter, has been generally accepted in the West, although it has, in the past, been necessary to stimulate demand in the summer by lower prices. The large percentage of coal used for domestic purposes in the West is the cause of the great variation in the need for coal as between winter and summer. The prices of prepared sizes were reduced 40c. per ton for the months of May, June and July and were restored to the full Administration figures on Aug. 1.

HEAD OF INCLINE AT HIAWATHA MINE OF U. S. FUEL CO.

With a national coal strike threatening, the demand for coal was excellent during the rest of the year. After the strike began Utah's mines were called upon to furnish coal to the less fortunate states, and the amount permitted for local supply was, in consequence, limited. However, as much had been stored by manufacturing industries, not many of these suffered, nor, in general, did the people of the state or those in the territory normally served by the Utah mines at any time lack fuel, although in many localities outside this territory the situation was acute. The Utah mines operated all through the strike and roughly 75 per cent of the production from Carbon County during all of November and the first two weeks of December was sent east. It was this coal that kept the lines of the Union Pacific System running.

The production by months was as follows:

Month	Tons	Month	Tons
January	370,900	Carried forward	3,055,918
February	312,961	October	455,840
March	317,532	November	458,374
April	236,559	December*	467,000
May	293,077		4,437,132
June	341,859		
July	376,621	Estimate of small mines	100,000
August	412,367		4,537,132
September	394,042		

*Estimated.

This is a decrease of 599,693 tons from the 1918 production, but an increase of 411,902 tons over that of 1917, and it probably shows a normal increase of 289,000 tons, which would be expected from the growth of the industry.

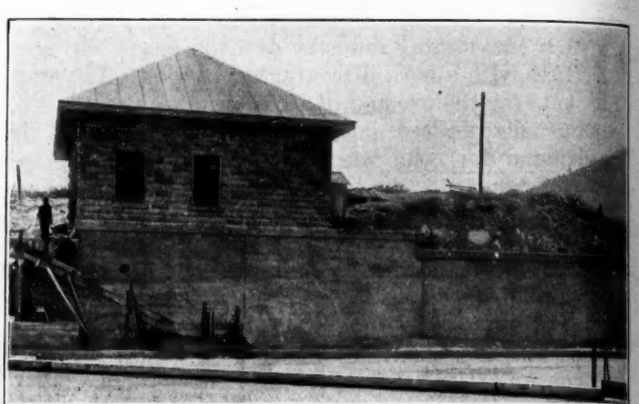
Several new companies began operations during the year, but only one of these acutually began to ship, this being the Kinney Coal Co., which has leased coal lands from the Union Pacific interest. This company is opening a mine just north of the Union Pacific Coal Co.'s old mine at Scofield, which is now being operated under lease by the Scofield Coal Co. At present the Kinney company's mine is only in the development stage, and the coal that is being shipped comes from entries. At its present rate of development, it will probably, by next spring, be shipping 500 or 600 tons a day.

GARAGES AT CASTLE GATE, UTAH, BUILT FOR EMPLOYEES OF UTAH FUEL CO.

The coke market, like the coal market, had, in general, a poor outlook during the year just past. Shortly after the signing of the armistice the smelters curtailed operations so rapidly that it was necessary for the Utah Fuel Co. to close down over one-half of its Sunnyside coke ovens. While there has, during the last six months of 1919, been slight improvement in demand for coke, it has not been sufficient at any time during this period to warrant the operation of over 60 per cent of the Sunnyside ovens, and from present indications it is questionable if the coke market will permit full operations of the present Sunnyside plant during any part of 1920.

The Utah Coal & Coke Co., with property holdings in the coking field south of Sunnyside, did some work on the outside preliminary to opening a mine. The current reports are to the effect that this company intends entering the coking industry, but all work at this property has been suspended for the winter.

Early in the spring of the year certain citizens of Salt Lake City started proceedings, which culminated in the formation of the Mutual Coal Co. Previously they had tried to have the city of Salt Lake go into the coal-mining business. This was impossible under the law, and two bills, presented to the State Legislature by the City Attorney, which would have given the city power to own and operate coal mines and coal yards, failed of passage, as presented, but as amended they did give the city power to own, operate and maintain heating plants.

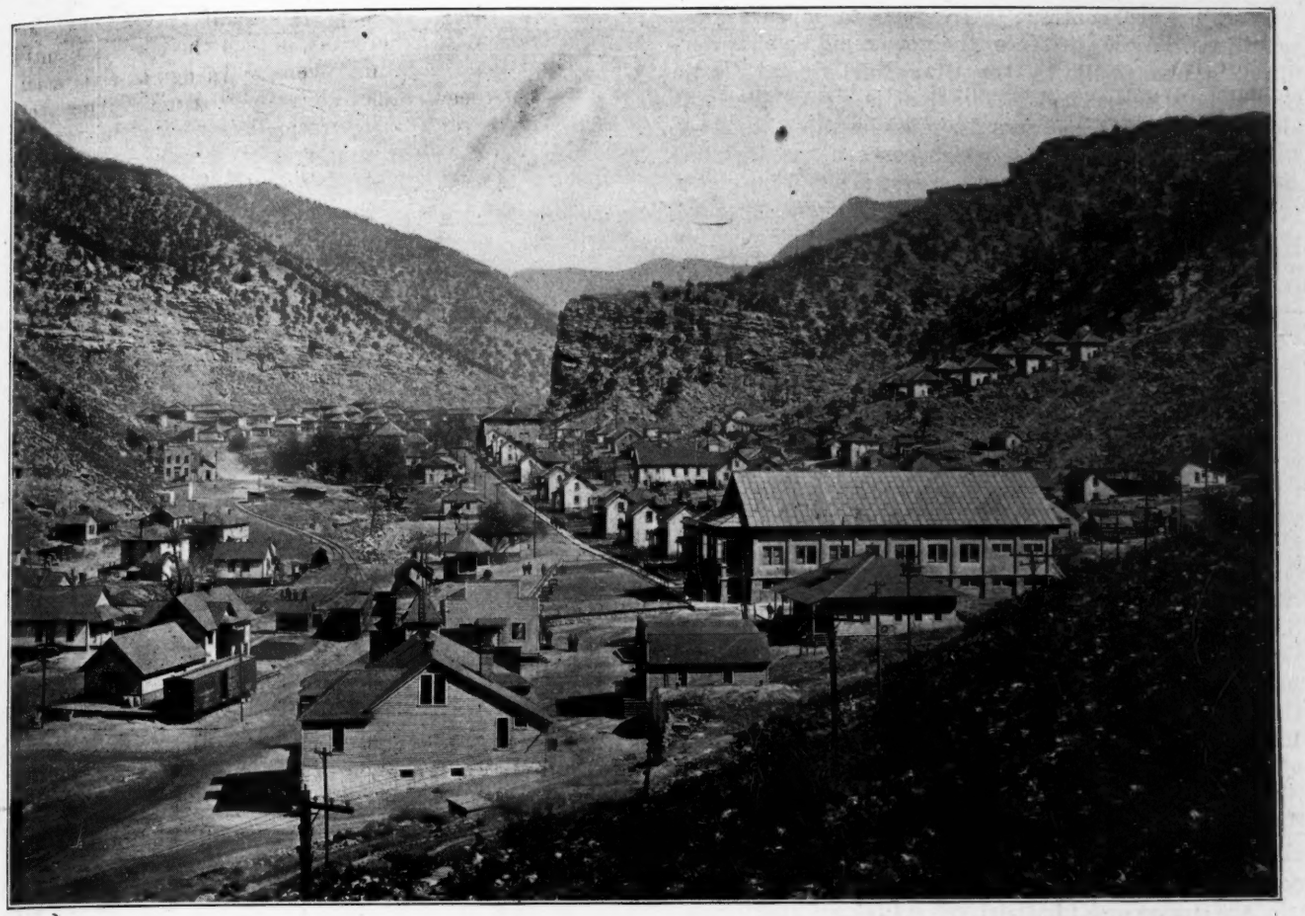


WATER FILTRATION PLANT AT CASTLE GATE

The organizers of the Mutual Coal Co. went ahead and formed a company with a capitalization of $250,000, represented by 25,000 shares of a par value of $10 each. The company leased 640 acres in Spring Cañon from the State and obtained 329 acres of Government land, also 160 acres for right-of-way and townsite purposes. Half, or $125,000 worth, of the capital stock is offered for sale, the stockholders being given an opportunity to buy coal next year at not more than $5.50 per ton, as against the current price of $8.25 per ton.

Another company is reported to have started operations in Spring Cañon, and two or three small concerns are said to have started up in Iron County, but so far its purpose will only be to supply the local market. The Iron County coal is so high in sulphur that it is not likely to at any time be a formidable competitor with the Carbon County (Utah) coals.

A consolidation of considerable importance was effected between the Wattis Coal Co., operating in Carbon County, and the Lion Coal Co., having mines in Wyoming. According to newspaper reports the new concern, known as the Lion Coal Co., has an authorized



VIEW OF THE TOWN OF SUNNYSIDE, UTAH. LARGE COMMUNITY BUILDING IS IN RIGHT FOREGROUND

capitalization of $5,000,000. Among the incorporators are David Eccles, president of the Eccles Estate; W. H. and E. O. Wattis, of the Utah Construction Co.; Jos. Scowcroft; M. S. Browning and J. M. Browning of machine-gun fame.

During the year there has been much interest shown in such State lands as are coal-bearing. The Supreme Court decision in the celebrated Sweet case unsettled the question of the state's right to coal lands in school sections, so that the title to such lands is uncertain in that it depends upon whether or not they were known to be valuable for mineral or coal at the time the state's rights attached, if at all, or on Jan. 4, 1896. Several suits have been instituted and continued litigation may be expected until Congress shall, by appropriate statute, settle the question definitely.

For years the status of the so-called "Milner interests," which claimed many thousands of acres of valuable coal deposits in Carbon County, has been in doubt, but it has, at last, been settled apparently by a compromise made with the State Board of Land Commissioners. The State relinquishes whatever claim it might have to 5564 acres of coal lands for a consideration of $556,400. It is intimated that these "interests" contemplate a large iron-and-steel plant, handling iron ore from the southern part of the State.

A new coal-mine tax law was enacted this year. By this enactment all coal lands are valued according to their coal contents. Coal companies no longer have to pay the occupation and net-proceeds taxes, but are now taxed on the value of their holdings and improvements.

This law is provocative of much uncertainty in regard to some lands. Apparently, as applied to lands recently appraised by, and purchased from, the Government at such appraised prices, the question is simple, as the Government's appraisal was based on the value of the coal contents. But development has sometimes proved such appraisals inaccurate. For instance, the burning of coal beds may in places have extended much further in from the outcrop than was supposed; or the coal bed may have thinned, or faults may have been discovered by development, and these defects will have affected land valuations adversely.

However, as the new law was not enacted until late, there was not sufficient time for the State Board of Equalization to make a thorough examination and appraisal of value, so that it temporarily adopted the Government's figures and made such adjustments as were obviously necessary. The State Geologist then undertook a comprehensive survey of the principal coal fields and has proposed a new method of valuation, based on royalty value per ton of coal contents. This method was submitted to the coal operators and is now under discussion.

Although there have been a few minor local labor troubles, the situation as a whole for the year has been tranquil, and Utah mines worked in full force during the national strike. Immediately following the Garfield award of 14 per cent advance in wages, Utah operators granted this increase. The wages of coal miners in Utah are now very high, and any industrious miner is assured of a good living. This, together with good working and living conditions and adequate educational facilities, will result in eventually attracting a better grade of miners to this field.

Operators still continue their efforts to improve these conditions. As an instance, the new rapid sand water-filtration plant built by the Utah Fuel Co. at Castle Gate may be mentioned. This plant is one of the most modern of its kind and was designed by the Pittsburgh Filter Manufacturing Co., which concern has installed some of the largest and most successful filtration plants in the United States. An illustration on page 182 shows the substantial way in which this important but often neglected detail of operation has been cared for by the Utah Fuel Company. A good water supply means healthier workmen and steadier operation of the mines.

The report of the State Insurance fund, which handles workmen's compensation, showed a net premium income of $354,387.59 and net benefits paid to injured employees or their dependents of $66,077.54. This covers a two-year period ending June 30 last. Effective July 1, the rate for the compensation of coal-mine workers was reduced from $7.81 to $7.29 per $100 of payroll.

The death of three men prominent in the coal-mining industry of the State must be recorded. The first, J. S. Thompson, general superintendent of Utah Fuel Co., had long been identified with coal-mining interests in this State and Colorado. A month after his decease, C. H. Gibbs, geologist of the same company, also died. In July W. G. Sharp, one of the pioneer coal men of the State passed away at his home in Boston. Mr. Sharp was largely influential in placing the industry on the sound basis on which it stands today.

Increased Output of Alaska Coal

The production of coal in Alaska in 1918 was 75,606 tons, valued at $411,850, according to the U. S. Geological Survey, Department of the Interior. This may be compared with 53,995 tons, valued at $265,317, in 1917. The production for 1918 was by far the largest in the history of coal mining in Alaska, being 40 per cent larger than the output for 1917, which was also greater than that of any previous year. It is believed that a substantial coal-mining industry has at last started in Alaska. The larger part of the output in 1918 came from the Matanuska field, which yielded 63,092 tons. The remainder came from eight or ten small mines in different parts of the Territory.

All these mines, except those in the Matanuska and Bering River fields and at Port Graham, produced coal for local use under free-use permits. About 12 mines were operated, employing 239 men for an average period of 254 days.

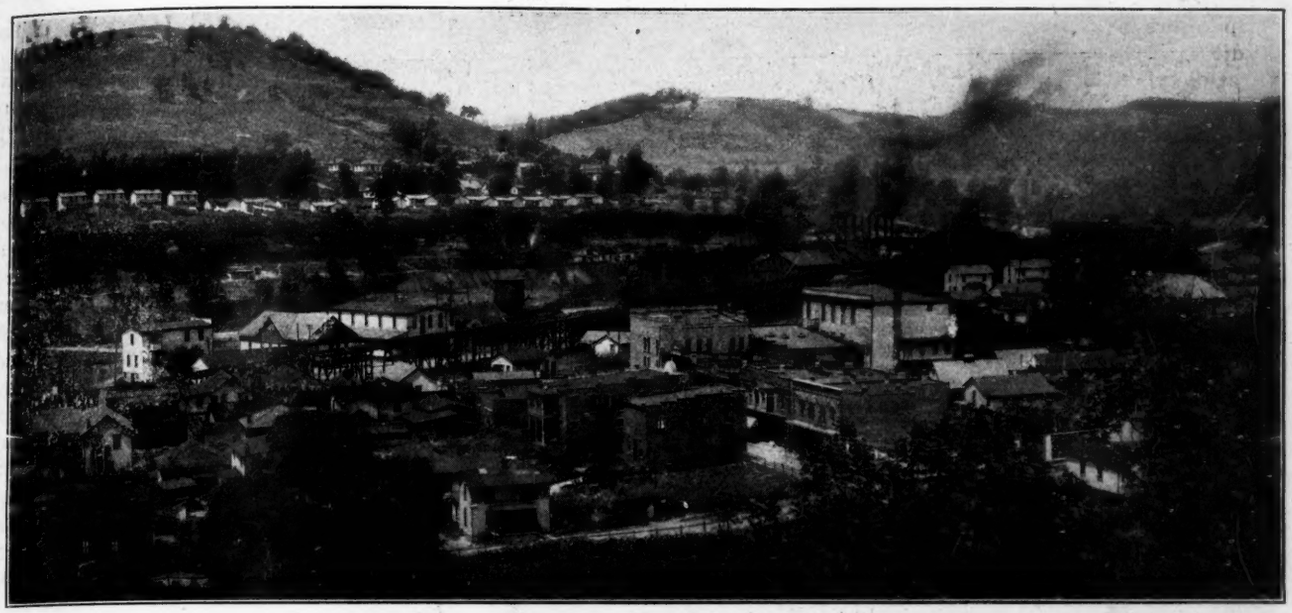
In the Matanuska field the Eska Creek mines were operated regularly throughout the year by the Alaskan Engineering Commission, to supply fuel for railroad and other Government use. At the Chickaloon mine, also operated by the Alaskan Engineering Commission, the work has consisted primarily of exploration and development, and only a small amount of coal, won incidentally, has been produced. In 1918, for the first time, Matanuska coal was shipped beyond anchorage. Private operations preparatory to mining were continued by two lessees in the Matanuska field, and some coal was mined by one of them, but their mines are not yet regularly productive. A detailed account of coal mining in Alaska is contained in a report on the Alaskan mining industry in 1918 just issued by the Geological Survey at Washington, D. C.

Fatalities of 1918 and 1919*

THE FIGURES shown below, compiled by Albert H. Fay, of the U. S. Bureau of Mines, seem reassuring but it must be remembered that the record for 1919 is one of low production. As compiled the records for both periods apply only to the first eleven months of the year.

	1918	1919
UNDERGROUND		
Falls of roof (coal, rock, etc.):		
At working face	717	599
In room or chamber	167	101
On road, entry, or gangway	207	152
On slope	14	11
Falls of face or pillar coal:		
At working face	89	112
On road, entry or gangway	16	25
Mine cars and locomotives:		
Switching and spragging	15	10
Coupling cars	10	5
Falling from trips	33	18
Run over by car or motor	180	134
Caught between car and rib	104	100
Caught between car and roof while riding	25	19
Runaway car or trip	64	41
Miscellaneous	31	24
Explosions and burning gas:		
Due to open light	55	63
Due to defective safety lamps	2	22
Due to electric arc	3	19
Due to shot	9	6
Due to explosions of powder	3	2
Miscellaneous	23	27
Coal-dust explosions (including gas and dust combined):		
Due to open light	2	22
Due to defective safety lamps	...	....
Due to electric arc	...	....
Due to shot	26	11
Due to explosions of powder	1	1
Miscellaneous	...	....
Explosives:		
Transportation	4	95
Charging	11	15
Suffocation	4	4
Drilling into old holes	2	....
Striking in loose rock or coal	...	....
Thawing	...	....
Caps, detonators, etc	3	3
Unguarded shots	...	1
Returned too soon	17	5
Premature shot	39	51
Sparks from match, lamp, or candle	11	8
Delayed blast	4	2
Shot breaking through rib or pillar	9	7
Miscellaneous	20	7
UNDERGROUND		
Electricity:		
Direct contact with trolley wire	53	35
Bar or tool striking trolley wire	4	2
Contact with mining machine	7	5
Contact with machine feed wire	12	11
Contact with haulage motor	1	2
Miscellaneous	9	9
Animals	8	3
Mining machines (other than 8c.)	17	27
Mine fires (burned, suffocated, etc.)	26	24
Other causes:		
Fall of person	5	5
Machinery (other than 10)	1	2
Rush of coal or gob	20	12
Falling timber	11	19
Suffocation in chutes	3	4
Hand tools, axes, bars, etc	22	1
Nails, splinters, etc	...	1
Miscellaneous	...	21
IN SHAFT		
Falling down shafts or slopes	21	20
Objects falling down shafts or slopes	9	6
Cage, skip, or bucket:		
Runaway	17	6
Riding with rock or coal		1
Riding with timber or tools		1
Struck by		5
Miscellaneous		5
Other causes:		
Overwinding	...	....
Breaking of cables	1	....
Miscellaneous	3	1
ON SURFACE		
Mine cars and *mine* locomotives	80	63
Electricity	14	8
Machinery	40	20
Boiler explosions or bursting steam pipes	7	5
Railway cars and locomotives	31	15
Explosives	11	....
Fall of person	11	13
Falling objects (derricks, booms, etc.)	10	9
Suffocation in chute, bin, or culm	4	3
Falls or slides of rock or coal	3	8
Steam shovels	1	1
Hand tools	...	1
Miscellaneous	22	15
Grand total	2,415	2,121

* Period covered is but eleven months ending November 30th.



BUSINESS SECTION OF THE TOWN OF MONONGAH, W. VA.

Northern West Virginia in 1919

By H. A. Williamson
Fairmont, W. Va.

IN MANY ways 1919 marks the beginning of a new epoch for northern West Virginia. After many vicissitudes the byproduct coke plant located at Fairmont is being completed. This installation, the first of its kind in the region, was started in order to supply the demands of the war. Ground had hardly been broken when the work was abandoned from some cause never made public. Later it was again started and again abandoned. Finally taken over by the Domestic Coke Corporation, the work of construction has reached such a point that completion can be safely predicted for next summer. The ovens are being erected by the Koppers Co., and as Fairmont coal has already been tried out in this type of oven there is no question as to the success of operation, it being merely a matter of working out the details.

The Lynn producer plant of the Monongahela Valley Traction Co. was put into operation during the year and while it is still in the experimental stage, it has progressed to such a point that there is no doubt as to its success.

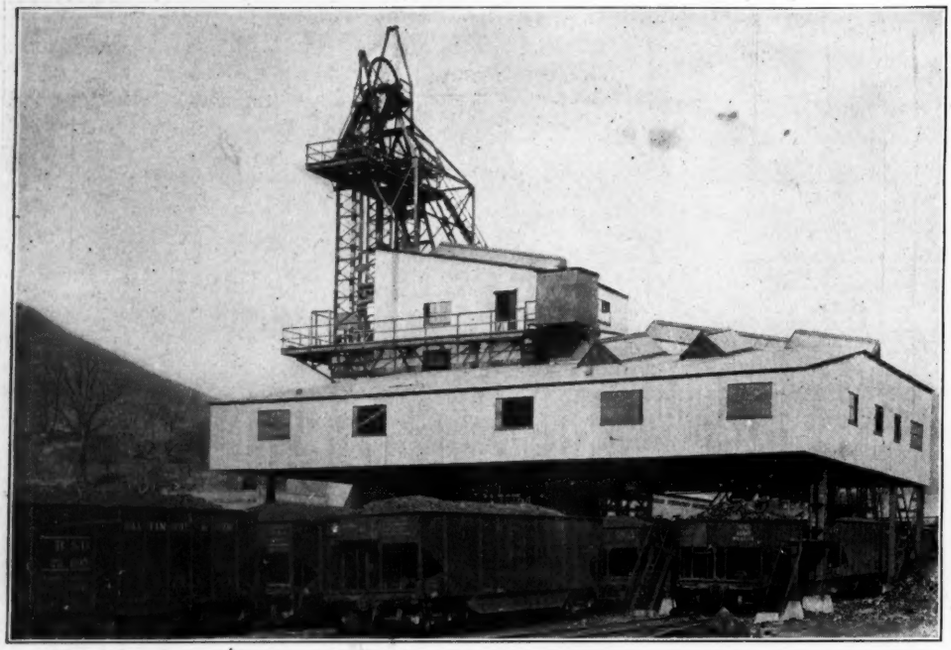
As both the byproduct ovens and the Lymn plant are but the first units of proposed large plants, their installation means the development of an entirely new series of industries in the upper Monongahela Valley. Enormous quantities of coal will be used locally and manufacturing industries can be assured a steady and cheap supply of gas fuel.

The most important completed development of the year has been the Rivesville power plant of the Monongahela Valley Traction Co. This plant, located between Fairmont and Morgantown, has been put into operation and is carrying practically the entire electrical load along the line from Rivesville to Fairmont and thence to Clarksburg. It also supplies points in the vicinity of these towns. This allows the several smaller electrical plants to be placed in reserve, making the ssupension of electric service highly improbable. The accompanying illustrations give some idea of the magnitude of this plant and the amount of detail involved.

Development on the Monongahela Ry., connecting Fairmont and Pittsburgh via Brownsville, has continued and a number of new mines have been opened. The Morgantown & Wheeling R.R. construction has been pushed steadily. A large portion of this road is already in operation and approximately 20 miles have been opened along it. This road develops an area of coal previously unserved—the part of the road so far completed and operating developing 100,000 acres of coal lands or even more. At the present time this coal moves over the Monongahela Ry., connecting with the New York Central and Pennsylvania lines. When the road is completed through to Wheeling it will give a direct Lake connection as well as one to the Middle West which with the westward roads out of that city will enable the Fairmont coal to reach all the Midwestern cities.

Quite a number of the smaller mines opened during the 1917 period have either closed down or passed into the hands of more experienced operators. The mines which during the war loaded railroad cars from horse drawn wagons are practically things of the past. The region is all the better for the disappearnce of these mushroom growths which were the product of an extremely abnormal period.

Early in the year deals in coal lands and formations of new coal-mining companies were frequent and more numerous than in 1918. At least two corporations capitalized at $1,000,000 have been organized and are actually mining coal. Ten other companies with capital stock ranging from $25,000 to $150,000 have

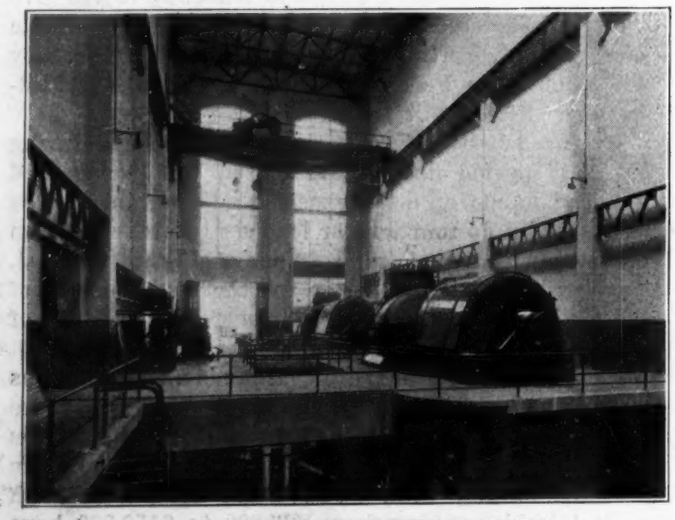


TIPPLE AT MINE 87 OF CONSOLIDATION COAL CO.

started operations. A number of sales ranging from $30,000 to $65,000 have been recorded; one sale in Marion County involved 5,660 acres of land while in one in the Philippi district $425,000 changed hands. Records of this kind have continued throughout the year despite the prospect of labor difficulties. They appear a clear index of the confidence entertained in the future of the region. This faith has not been confined to the Pittsburgh bed as in the past, in fact a large number of the transactions cover seams other than the Pittsburgh.

Whether or not these operations in the smaller beds will pay a dividend in normal times is a disputed question which cannot be answered now. Regardless of whether they pay or not, their development brings to the region a new problem, that of mines above mines. In the past the question of protecting upper beds has had little attention but in the future, when mining advances sufficiently, the question of protecting one mine from damage from another below it will demand a solution.

Another problem crying for attention is that of



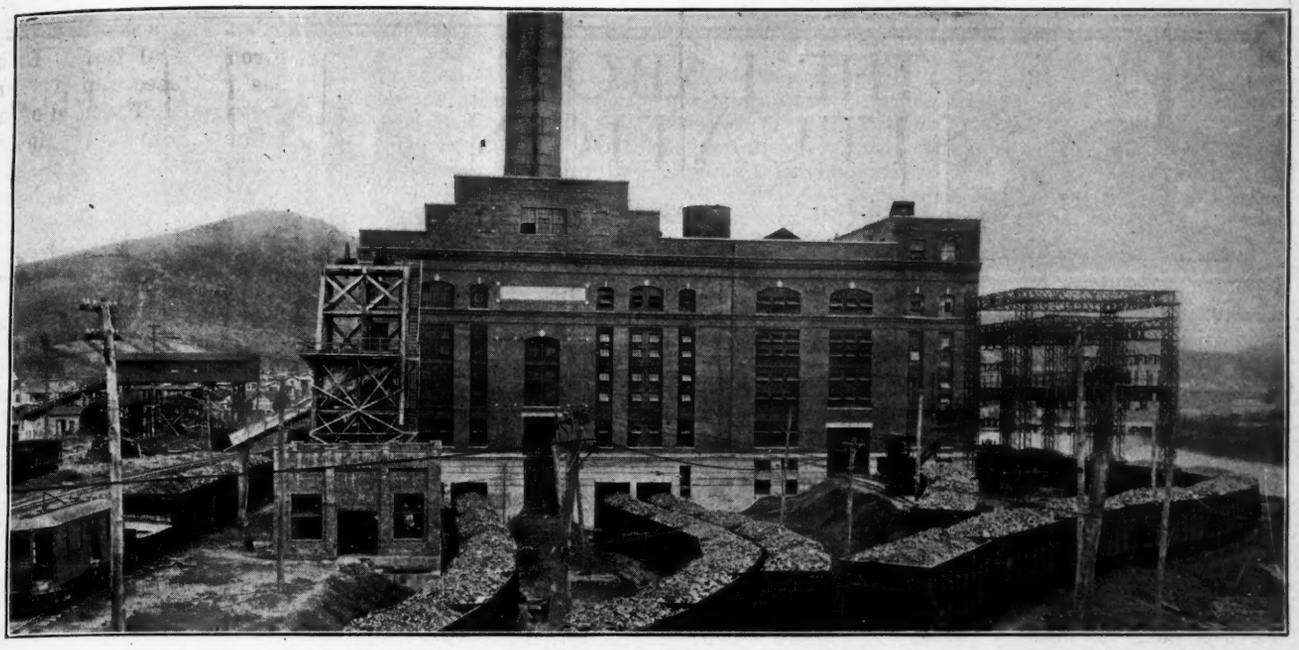
TURBINE ROOM, RIVESVILLE, W. VA.

oil and gas wells drilled through coal beds. Drilling has increased rapidly during past years. The need of legislation defining the rights of drilling companies and coal companies, and some method for the proper protection of the miners' lives, as well as the coal, without unfair hardship to either party, is constantly becoming more pressing. As the matter stands some of the companies have gotten together in mutual agreements for protection both of mines and wells, but this is at best an unsatisfactory condition and the smaller companies are making practically no effort at protection either way.

It is safe to say that at least one rather large area of coal will probably have to be considered as permanently lost on account of the numerous wells drilled through it. One of the worst features is that many of these wells are not accurately located on maps and there are no permanent markers on the ground so that in future years mining operations will be in constant danger of making contact with an old well abandoned either as a dry hole or exhausted, yet making enough gas to cause an explosion.

Lack of cars and a desire to give the men work as steadily as possible has caused serious consideration of many coal storage propositions. A number of storage bins have been erected and considerable coal has been stocked in piles on the ground—by far the larger part of this has been slack. The two difficult questions involved in this problem are: sufficient room and the danger of spontaneous combustion. The latter can be largely overcome by careful and proper work. If this and the matter of proper facilities for storing coal at terminal points was given more attention it would go far toward relieving the car shortage situation.

The year has been marked at intervals by several bad fires. The Consolidation Coal Co.'s tipple at Mine 37 was completely destroyed with a loss of $20,000, the tipple of the Mound Coal Co. at Moundsville burned, the tipple at Mine 56 of the Consolidation Coal Co., located at Fairmont was also burned. This is one of the older mines in this field and is of historic interest. It was opened in 1860 by J. O. Watson, Sr., and Ex-Governor A. B. Fleming. The mine workings are quite extensive and lie under the residential portion of Fairmont. The mine has not been worked for a number of years but is not permanently abandoned as there is a large quantity of coal still available. The electric power plant at Mine 38 of the Consolidation Coal Co. was likewise destroyed by fire with a loss of $10,000. A part of the Jamison Coal and Coke Co.'s plant at Mine 7 was destroyed. Within the mines there has occurred two or three small fires, among them quite a stubborn one within Mine 21 of the Consolidation Coal Co. This required hard and con-



POWER PLANT OF THE MONONGAHELA VALLEY TRACTION CO. AT RIVESVILLE, W. VA.

tinuous work for several days before it was controlled.

Safety and welfare work have received continued attention. The most notable feature in this direction was establishment by the State Mining Department of a rescue station at Fairmont.

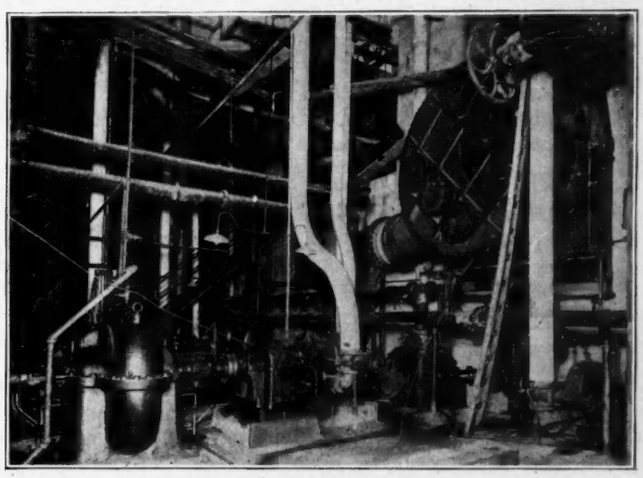
An estimate of production of the region is always difficult to make owing to the many local factors that affect it. Ten and one-half million tons is probably a fair estimate for 1919. This figure is about 20 per cent less than the output of 1918. The reduction in tonnage was due to several causes. The November strike, of course, diminished the possible output but the weekly figures of the U. S. Geological Survey show that the total time lost (not including the strike period) ranged from 20 to 60 per cent. During the early part of the year a large part of this loss was charged against "No Market." However, though as much as 60 per cent is at times charged to this cause there is no point where the charge of "Car Shortage" entirely disappears for a sufficiently long period of time to be noticeable.

Car Shortage Is Keenly Felt

In other words, there was practically never a time when sufficient cars were on hand to load the booked orders. The charge against "Car Shortage" steadily increased during the year as that against "No Market" disappeared. The charge against "Labor Shortage" is small, as is the charge against "Mine Disability" while there is practically nothing to charge against "Strikes" other than during the November period. Culled and sifted the report harks back to the same old proposition of no cars.

Early in the year there was undoubtedly some improvement in the car situation, due more to lack of demand than anything else, but when the demand increased the situation immediately became acute again. Because of this feature there was in reality no labor shortage and the labor available could not work full time. Operators made constant effort to keep the men busy, but in spite of the best they could do, there was a continuous movement of men from place to place. This situation has been unsatisfactory since shifting labor brings many other problems in its wake.

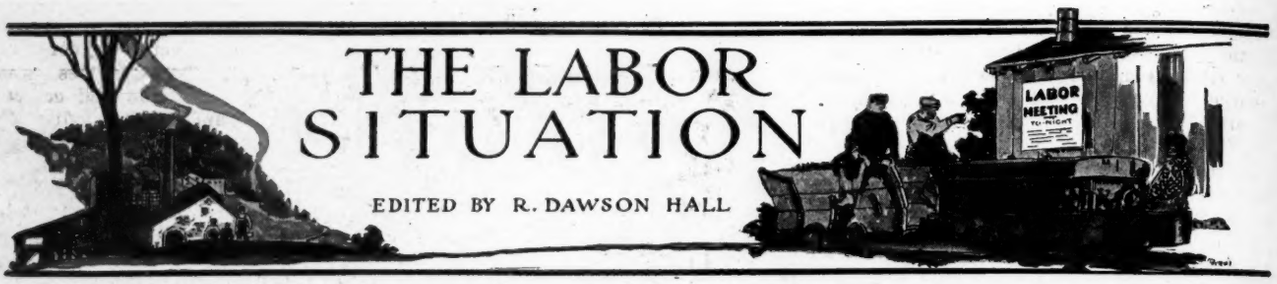
It appears then that the tonnage decrease has arisen more from car shortage than from all other causes combined and the general opinion is that the tonnage would have increased over that of 1918 had cars been available for shipment.



CIRCULATING PUMP UNITS AND CONDENSERS AT RIVESVILLE, W. VA.

The coke tonnage for the year decreased under the previous year probably 60 per cent, largely because of price. It has been pretty thoroughly proven that northern West Virginia operators do not care to make coke unless under special inducements and it appears that about the only special inducement that is presented is an abnormal price.

On the other hand, the shipment of coal to lake ports increased about one-fifth over that of last year and the total shipments for 1919 will run in the neighborhood of one million tons.



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

Miners and Operators Meet With Coal Commission

Formal presentation of the miners' side of the coal controversy as well as the personal attitude of the miners' representatives makes it increasingly clear that everything possible is being done to forward the nationalization plan. It is very clear that mines in a competing position cannot meet the demands of labor without pooling, and it is recognized that there can be no extensive pooling without nationalization of the coal mines.

The representatives of the miners, now that the Government is going to make a ruling, have taken from their graveyards all their lost causes of the past twenty-five years and have laid them before the commission.

The operators have agreed to be bound by the award of the commission with one reservation: that they will not be bound by any decision of the commission which may fix prices beyond the duration of the Lever Law. Many fear that operators of the Central Competitive field place themselves in a position where nationalization will furnish the only means whereby the award of the commission can be carried into effect.

Philip H. Penna of Indiana, representing the entire group of bituminous operators, created a most favorable impression on the commission by the manner in which he met the claims advanced by the officers of the United Mine Workers. Mr. Penna made a formal request of the commission that it ask Congress to enact necessary laws to require certain qualifications of those who enter into collective bargaining so as to make both parties responsible to a contract.

At Tuesday's hearings Ralph Crews, counsel for the operators, submitted a statement in which it was stated that there was no desire on the part of the operators to make their acceptance of the commission's award in any manner contingent upon the answers to the questions which were submitted at the initial hearing. He explained that since the operators have the best of legal advisors, that they may not lawfully be parties to any arrangement by which the price of coal is fixed beyond the date on which the Lever Law expires.

Operators Want Decision To Bind Both Sides

He said that the operators were willing to submit all other matters in respect to the mining of bituminous coal with the understanding that the award of the commission is to embrace a decision upon all such matters, "binding upon the miners and operators, and shall, in and of itself, constitute the final contract between the miners and operators for such period of time as shall be fixed by the commission." Beyond the reservation which applies solely to the price of coal Mr. Crews stated that there is no thought of any other reservation.

At that point of the proceedings John L. Lewis, the president of the United Mine Workers, interposed to say: "I trust that a record is not being made that may be used subsequently to prevent fulfillment of the obligation to meet in joint conference, and write into the agreement the basis of the commission's award." This objection was met to his satisfaction, however, when Chairman Robinson said: "I may say that the chairman's thought of that is, that in reply to the chairman's question, as to whether the record is completely open on that subject that it is for the commission to decide and Mr. Crew's reply was that it is for the commission to decide. I am wondering if that would clear the record sufficiently."

Mr. Lewis in his opening argument for the miners submitted all the demands which had been made at Cleveland, and in addition paved the way for the introduction by the district presidents of all the minor grievances which have been subject of the negotiation during the past twenty-five years. He declared that the miners would not be satisfied with being restored to their pre-war status as wage and working conditions at that time, he declared, were far from ideal and he urged that no decision be made on a mere comparison of living costs now with living costs in 1913. "We are placing the rights of humanity, carrying with them the joys of life and the pains of death, alongside the property right of those who are operating the mines. We are mindful of the rights of capital to earn a proper income upon its investment but we say to you that humanity has a prior right of consideration and society owes an obligation to the men who toil in the mines."

Short Day, Weekly Pay, No Strike Penalties

While Mr. Lewis declared that there should be a shorter working day so that the miner would not be held in the fetid atmosphere of underground workings, his principal argument for shorter hours was based on the desirability of continuity of employment rather than there being work on an average of 30 hours per week. Even President Lewis in his generalization took up such details as a weekly pay day, and he made one of the features of his presentation the necessity of abolishing the automatic penalty clause.

In the course of his argument, William Green declared that the operators are committed to this arbitration because at the last joint conference held between the miners and operators in Washington before the strike, Mr. Penna had moved that there be a tribunal created by an equal number of the miners' representatives, coal operators, and an equal number representing the public, to whom all of these differences shall be referred, and that we agree to accept the result, to constitute a contract effective until March 21, 1922.

Much of Mr. Green's presentation looked to the establishment of the fact that the annual wage of the coal miners is not sufficient to maintain a decent family budget. He urged the commission to go most exhaustively into the matter of the profits of the coal operators. He declared the Government prices had been so fixed that the high-cost mines could make such a profit as to stimulate great production. He expressed the opinion that the public would be surprised when they learned the truth about the enormous profits which have been made by the mines with low costs.

In summing up his argument Mr. Green declared that "the miner is not a machine to be laid upon the shelf when there is no work for the machine to do and taken off the shelf and used when there is work to do. The human equation must be considered and consideration must be given the family budget for the year. This is in addition to the hazard of the industry."

Philip Murray, president of the western Pennsylvania district, presented the specific claims of the miners in that district; payment for the removal of slate and bone coal; differentials between the thick and thin vein portions of the Pittsburgh district; furnishment of electric cap safety lamps and permissible explosives and the relief of the miner from the pushing of mine cars.

John Moore presented the specialized grievances for the Ohio mine workers, Edward Stewart made the argument for Indiana miners, and Frank Farrington for the Illinois workers. Mr. Stewart made a particular point of the fact that the Indiana operators have not complied with the law in that state providing for a weekly pay day. He also contended that the 14 per cent increase should apply on the rate that the men were receiving including the bonuses.

Mr. Farrington was particularly caustic in his comment on the publication of the statement that political rivalry between himself and Mr. Lewis had much to do with the calling of the strike. He expressed the belief that the publication of that article prompted the Government to attempt to meet the strike by injunction. He said it was an effort to capitalize the woes of the miners of America.

Mr. Farrington's idea of Dr. Garfield's methods of arriving at the 14 per cent increase was expressed to the commission as follows: "Dr. Garfield predicated his opinion upon some academic theory unknown to anyone but himself. I assume it is the means they apply to mining coal at Williams College. At least I never heard of the rule being applied to mining anywhere else. He accepted Secretary Wilson's figures to the effect that the cost of living had increased 79 per cent, and in order to meet that increase the miners were entitled to 14 per cent more in wages. This was an implication that they already had received, since the beginning of the war, an aggregate increase of 65 per cent.

Cannot Solve "What a Day's Work Is Worth"

All of the representatives of the districts submitted extensive statistical compilations, showing cost of living and various deductions to wages. Mr. Crews, after listening to the mass of detail which had been laid before the commission by the representatives of the districts, made this statement to the commission: "In my judgment you must deal with the situation as a whole which has been produced by these many years of bargaining, or sit here reconciled to deal with this industry for months and months to come. A gentleman said yesterday, with deep feeling, 'Why should a man spend 25 per cent of his time moving slate for nothing?' He should not.

"No operator contends that a man should go down into the earth and move slate for nothing. I do not doubt that that statement as it was made would make some impression upon you, gentlemen, as an isolated fact. How are you going to deal with it?—What is involved?—Under what conditions does that man work?—What is the wage scale?—How is it arrived at?—Were the conditions under which he works taken into account when his wage scale was fixed?

"It cannot be that those men expect this commission to take up and dispose fairly of all those matters, picked out for purposes of presentation from the general mass of events. The whole issue before this commission is the wage scale and when you reach a conclusion upon the wage scale that is fair and just, it absorbs and disposes of all these matters."

The refutation of the more detailed claims of the miners was left to Mr. Penna and he declared that he was in entire accord with the miners on most of the points which they have made. "It will be a sorry day for the nation," he said, "when people reach a state of contentment with the position in which they find themselves," so that he regards it as quite proper that the miners should object to going back to 1913 conditions.

He also stated that he is in accord with the demand that the industry be made safe and sanitary, and he pointed out that there are men among the coal operators who recognize the human equation. He said the miners were not sincere in their demand for a 60 per cent increase in wages, but there is no need of discussing that question because the commission will be influenced by data presented, rather than claims made.

He declared that coal miners in the Central Competitive field maintain a standard of living that becomes American citizenship, and that this is made possible by the fact that they receive a sufficient wage. Miners do not live in squalor. "They do not require the sympathy of anybody. They are a class of men who stand erect with confidence in their own manhood; they maintain good homes, homes that they own; their children go to schools and colleges; they are educating their children and they are living in comparative comfort. There is not a mining community anywhere in this country where this does not prevail.

"The time has gone when employers of labor can oppose labor unionism. The right of the laboring man and woman to unionize is just as sacred, and just as compelling as the right of the employer to unionize, either to unite as persons or as individuals in a corporation.

"The laboring people of this nation are going to unionize themselves. They cannot defend their interests individually. With unions there come contracts which are of no avail, except when supported by an organization, and enough responsibility is necessary to enforce the contract.

"The mine workers come and ask that the automatic penalty clause be taken out. The only semblance of liability with which they have had to contend—the only suggestion of responsibility that they have accepted—to be bound by contract provisions is this fining system, and they come now and ask that they be relieved of it."

Mr. Penna explained that much of the good effect that could have been obtained from this provision had been lost due to laxity in its enforcement. He asked that instead of removing this safeguard the commission make it stronger. The check-off system came in for vigorous denunciation in Penna's remarks. "The coal operators are desirous of abolishing, once and for all, this check-off system. It was introduced for the purpose of enabling the mine workers to unionize their forces to enforce contracts but since the very purpose for which the institution was created has failed there is no necessity longer for the system.

It imposes burdens upon the operators for which there is no economic justification and it is unjust to many employees of the operators." The commission was asked by Mr. Penna to cover in its findings the matters of including house rent and household coal in contracts. He opposed this system as it is a source of irritation and a species of paternalism which should be abolished.

Particular emphasis was laid on the necessity of making the national officers of the United Mine Workers and the national organization responsible for enforcing the terms of contracts in the various districts. He explained that the national officers are not obligated to enforce contracts except as to violations between districts but not within the districts.

Union Opposes New Machines and Time Clocks

With reference to yardage and the differential in machine mining Mr. Penna said among other things: "The idea is that the mine workers should receive the benefit from the introduction of machinery, the operator being allowed only a profit on the investment. Pursuing this policy we have been prevented from introducing other machines.

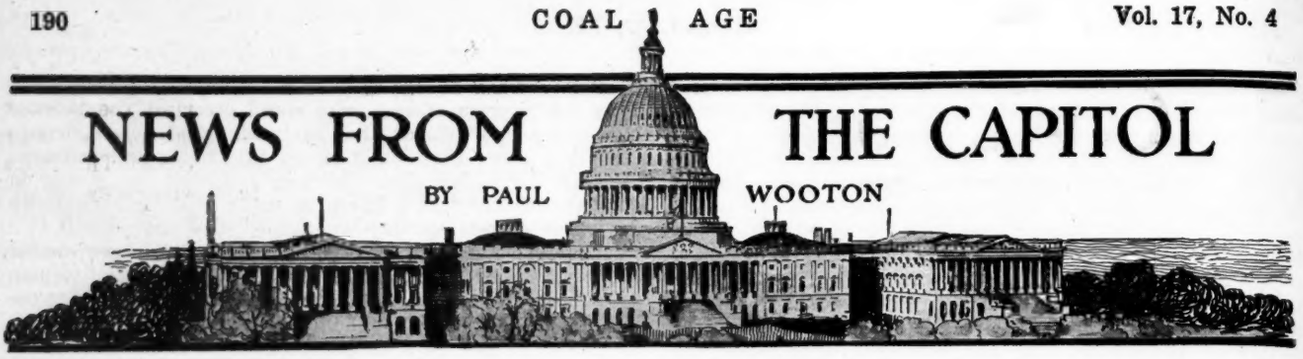
"Other machines have been developed that will cut a great deal more coal and perhaps a great deal cheaper. We have not been permitted to try them." The necessity of installing time clocks in the mine and for the use of the surface workers was another point made by Mr. Penna. "It seems almost unbelievable, that in a great industry surrounded with so many complications and dangers as the coal industry, there is now no system by which actual working time of the miners can be determined. We have been interfered with in the installment of such devices. The right of the owners of property is questioned as to its control, except as provided in our contract."

Mr. Penna criticized the representatives of the different districts for bringing several of the grievances here when they fully understand that these changes would have been made but for the restrictive provisions of the interstate agreement.

In concluding, Mr. Penna took issue with the statement that the wages of the miners were too low in 1913. He asserted that there were no wages paid by other industries in the same region which were as high as those paid at coal mines.

NEWS FROM THE CAPITOL

BY PAUL WOOTON



Hines Says Coal Strike Cut Down Rail Earnings

As indicated a few days ago, says a statement issued last week by Director-General Hines, the operating results for November were very seriously affected by the coal strike. Detailed statistics of the operating results for the month of November have now become available for practically all of the Class 1 railroads and large terminal companies in federal operation.

These results indicate that there will be a net operating income for the month of November from the operation of these properties of $22,000,000, which represents a loss of $53,000,000 to the government, after allowing one-twelfth of the annual rental, or $61,000,000, on the basis of the net operating income earned during the average November of the test period.

Philadelphia Retailers Protest

The National Retail Coal Merchants' Association addressed the Attorney-General on Dec. 24 protesting against the imposition of a retroactive price agreement which might be arrived at by the President's Coal Commission, upon the retail coal trade. The letter explained the inability of the retailer to bill back upon his large number of small consumers for an additional amount to cover a retroactive increase in the mine price, and protested against this practical imposition upon the retail coal merchants of the entire burden of increase to cover a further wage advance.

The association stated further that the only remedy is the removal of retail price restrictions. The letter to the Attorney-General has also been put before the President's Coal Commission, and the association shall probably be called upon later for more details.

Bureau of Standards Test Track and Mine Scales

A great deal of work has been done by the Bureau of Standards three sets of railroad track scale testing equipment. Car No. 1 operated during the past month in Tennessee, Pennsylvania, and the District of Columbia, testing three industry and one master scales.

The work included a special investigation upon a new grain hopper scale at Altoona, Pa. Equipment No. 2 operated in the States of Washington, Oregon, Utah, and Colorado, testing 18 railroad-owned scales and 10 industry scales. Equipment No. 3 covered the States of Wisconsin and Illinois and made tests on 27 railroad-owned scales and one industry scale.

Owing to the unsettled conditions in the coal mining districts, due to the recent strike and also to unfavorable weather and bad roads, the Bureau's mine scale testing equipments were not in use during December.

Refuses to Take Up Harris' Coal Corporation Tax Resolution

Senator Harris, of Georgia, author of the resolution (S. Res. 247) requesting information from the Secretary of the Treasury relative to income and profits tax returns of coal corporations, made an unsuccessful effort in the Senate last Friday to call up his resolution for consideration. Objection was made by Senator Smoot, of Utah, and the resolution, under the rules of the Senate, went over without action.

Britain Permits Coal Exports Under General License

The British Board of Trade last week announced that, with a view to the decentralization of coal export control, an open general license had been issued, effective Jan. 1, permitting the export of coal, coke and manufactured fuel to all foreign destinations, except Russia, Germany, Hungary, Austria, Turkey and Bulgaria, subject, however, to previous approval of the Comptroller of Coal Mines, and subject to shipment being made in a vessel approved by the Commissioners of Customs and Excise.

President Asked to Enlarge Coal Commission

The *Wall Street Journal* of New York City states that representatives of five groups of public utilities in Indiana have petitioned President Wilson to enlage the Coal Commission by increasing the public's representation.

Tariff Commission Studying Coal

The *Weekly Digest* reports that the U. S. Tariff Commission is making special studies of certain commodities now on the free list relating, among other things, to coal, including both anthracite and bituminous When completed and published the report will be presented to Congress for its consideration, in connection with proposed tariff legislation.

Recovery in British Output of Coal

Trade Commissioner Leonard B. Gary states, in Commerce Reports, that there has been a substantial recovery in the output of coal in Great Britain since the railway strike, which ended on Oct. 5. For the last week of that strike the figures were 2,871,610 long tons; for the following week, 4,076,862 tons; for the week ended Oct. 18, 4,727,465 tons; and for the week ended Oct. 25, 4,761,037 tons.

COAL AGE

PUBLISHED BY McGRAW-HILL COMPANY, INC.
TENTH AVE. AT 36TH ST., NEW YORK
Address all communications to COAL AGE

Volume 17 January 22, 1920 Number 4

Our Vanished Thrift

MANY WERE the gratulations, during the war, on the growth of frugality. "Baby-bond" holders, we were told, were being created by the millions. Henceforth we would be a frugal nation. Every man would have a nest egg, every one a reserve for the rainy day. Instead it may be wondered if the Liberty Bond purchases did not have an unfortunate effect. Bought by the infrugal, as well as by the frugal, they were sold in numbers after the war for the purchase of luxuries hitherto unattainable. This raised the standard of living and the cost of maintaining all standards.

We are suffering today from the boost thus given to luxury. Silk shirts and hosiery, fur coats, talking machines and automobiles were purchased or partly purchased by parting with Liberty Bonds (often as low as 30 points below par). The difficulties in completing payments, in keeping the pace set or in running or maintaining in condition the luxuries thus bought made a high wage more than ever necessary. The spenders were continually being augmented in number. When one bought the others had to buy. People can go without food but they cannot afford to be out of style. Frugality was thrown to the winds. The hope of those who saw in Liberty Bonds a chance to make the public thrifty faded with the armistice. The Liberty Bonds after the war acted only like a delayed pay day or a period of detention in a lumber camp far removed from opportunities for expenditure. They caused a wild era of spending when the chance to spend came and when all was spent came the bitter period of dissatisfaction.

The public would duplicate the orgy of spending but refuses to prepare therefor by a period of saving. The discontent is natural but inexcusable; the return to the old standards forced irrevocably by our production capacity will be long and difficult. The return from silk to cotton must be indeed made soon, but the road is long and exceedingly hard to travel.

Seasonal Differential in Coal Freights

ANY differential in coal freights between winter and summer, such as is now quite generally being advocated by authorities in the coal and railroad industries and elsewhere, would doubtless be greater on long-distance transportation than on that nearer home. The differential would therefore act most markedly on the proportion of the freight service involving longer hauls. Such a difference in rates would result in concentrating the long hauls to the summer and the short hauls to the winter. The railroad lines might well have less to do in the frigid than in the balmy months due to the fact that the tonnage produced could be equal the year round (or even greater in the summer as is often the case in the anthracite region), and the transportation needed in the winter would be greatly reduced per ton delivered.

It is interesting to note, however, that even today without any differential the consumers furthest away from the source of supply buy first. In the more distant cities there was little trouble during the present strike but the consumers in the coal fields had let their opportunities slip and were without coal. The more remote municipalities do, out of fear, what they cannot be induced to do by frugality. They know that winter brings snowbound railroads, storm-staid boats and frozen rivers. It also brings frozen coal, embargoes and much uncertainty. Thus all the distant points bought coal while the nearby cities failed to do so and suffered from this lack of prescience.

That being so, it passes understanding how railroad cars have been so hard to obtain since the strike was concluded, seeing that they had been quite largely directed into idle coal fields or areas nearby. Surely when the coal mines reopened these cars were handy for distribution, though the non-union fields might be bereft. Only one thing explains the car shortage that followed the strike and that is that car shortages are now almost the normal condition and will threaten industry at all times except when business is bad. Year by year we approach the time when the coal used by the country will be determined not by our consumptive abilities but by our railroad facilities, just as now the main reason for short shipments to Europe rests not so much in an inadequate merchant marine as in a shortage of coal-loading facilities. It is said that while boats might be had to transport in excess of 25,000,000 tons per annum there are no docks to take care of any larger tonnage.

Thus it is that, as we grow older, our power to supply ourselves with food and with fuel is now no longer conditioned by the spread of both before us but by the rapidity with which our palsied arm of transportation can perform the journey between the table and the mouth. In short we may starve in sight of plenty as enfeebled and forsaken persons have sometimes been known to do.

Of All Unwise Boastings

UNHAPPY are the boasters. Most of us have sat under banquet orators and heard them tell how coal was the master, coal was the king, that the United States could not do without fuel. We have cheered them to the echo, for we delight to be important. Now we know that our sorrows all are bound up with that importance. Like the hard-working drab old maid of the family we have been so egregiously important that we are now held to a sterner course of action than is demanded of our more frivolous sisters.

In the past week a correspondent wrote *Coal Age* that the industry had gained by the strike, for everyone now recognized what coal meant to the nation. Alas! it is an irony of our importance that we are made to serve. The public relies on us. It cannot spend the time to inquire into other and less needful industries, to fetter and control them, to condemn and to berate them, but us it *must* find time to coerce.

The railroads were tied to the plow because they were found useful and serviceable. Across their broad backs were laid the whips of regulation. Not because they watered their stocks were they punished and destroyed. Many luxury industries made larger profits and paid bigger dividends, and they escaped even investigation. But they were not important. If only the coal industry were the least necessary, a malingerer in the field of production, something we could do as

well without, there would not be so many laws written for our admonishment, so many boards created for our control. May the public forget the importance of the public utilities and give them the freedom they accord so readily to other industries—that freedom that has made the non-essential industries expand so luxuriantly and develop so astoundingly.

Rights of the Public

FEARSOME indeed is the individual who dares question the rights or doubt the right purposes of the public. Is not the purpose of all government to protect the public interest and is it not necessary to have faith, a blind faith, in that public that must in the end make our laws? However, it would appear that much good oratory has been wasted in making out a good case for the public as against the individual.

Looking back in the laws of earlier days it may be seen that it was usually found more necessary to protect the individual than the public. When a man was tried for treason, the most abhorrent of crimes, the British law gave counsel the right to make thirty-five peremptory challenges, whereas the public (in its phraseology termed "the crown") was not allowed to challenge a single witness without giving to the judge a satisfactory cause for such a challenge. In criminal cases in our own land the accused is given more peremptory challenges than the accuser in some jurisdictions.

The logic for these provisions is clear. The public has a large interest in the suppression of treasonable and criminal persons but the country will go on in reasonably comfortable conditions even though the criminal escapes unconvicted, whereas the accused if condemned will lose his life or his liberty, about all that he has.

A similar condition exists when questions regarding an industry are at issue. If the producing or operating company is given conditions which make operation impossible it will be obliged to close down. Under those circumstances the whole investment will be lost, for, to particularize, the mine that produces coal at a loss is worth nothing except as a futurity. So long as the price is too low the property has no real but only a potential value.

The mine worker who gets an unfair wage is injured by the amount that the wage is unfair. Let us suppose the increase in the wage rate conceded by the Coal-Strike Settlement Commission is such that 25c. per ton will just cover the increase. On 500,000,000 tons per annum that would mean an increased cost to the nation of $125,000,000, or, roughly, $1 per person a year. The public is terribly wrought up about that dollar, strange to say.

But what does it mean to the mine workers of whom there are 600,000? About $200 per year. And what to the operator? All or nearly all he is making and almost all he has already made, for what he has invested is depreciated if the price paid is not right. It is clear that the mine operator, mine worker and public have a very different interest in the issue. The public really cares little, the mine worker more and the mine operator most. For this reason the interest of the last looms largest and the public being only one of the parties at interest is not entitled to be the sole judge of the justice of its claims.

Let the matter be illustrated in another way. The railroads cost the public ten cents per day for each man, woman and child in the country. A slight increase above that would not be seriously felt by any one but it would put life and vigor into the railroads.

The public as a whole is too often not inclined to be fair. It is a party at interest as is the particular industry being tried. Owing to its bias it has made decision that have ruined the railroads and the traction lines. So far it has been more considerate of the farmers, the coal companies and the packing trades, but the elements of injustice which have injured two basal industries exist to jeopardize the existence of the others.

It is important that the mine workers shall get nothing more than justice, for it would be demoralizing if by a combine in flagrant restraint of trade, pursued almost to the point of demoralizing the country, the mine workers were to acquire anything larger than what is just.

We cannot regret that the public is not more largely represented on the commission. The commissioners will doubtless decide that they will base their agreements on certain premises the nature of which they will probably set forth at length.

If the public does not approve of those premises it will not matter if there are three or thirty on the commission. There are few questions of fact. The inquiry is really as to the economic basis on which the decision shall be determined.

If the basis of the award is presented forcibly the public will be impressed; if not the public will see nothing but its selfish present advantage. It will recognize only that it has to buy coal whether it will or not and that it finds it hard to raise the money to pay for it and without further inquiry will condemn the commission, large or small.

It will be well if when the commission registers its decision it lays down some homely words of wisdom that will lend strength in the settlement of other disputes of like nature to this.

How the Coal Strike Starved the Copper Miners

The copper miners have been working very irregularly during the past year, much more irregularly than the coal miners. When the coal strike came, it shut down the copper works at Butte. Says the *New York Times* of Jan. 11:

> "The copper mines were shut down during the coal strike, and such miners as could get away, including many of the best of them, had left the place. Families that stayed during the period of idleness furnished destitution cases by the hundreds.
>
> "The city and the Salvation Army did what they could in the way of relief of the many cellar tenement families very near the starvation stage, and even nearer to freezing—for this non-employment and coal shortage and the blizzard with subsequent way-below-zero weather all came together.
>
> "The copper company also did relief work. But all the agencies together were no match for the destitution. The head of the Salvation Army told me that if the thing lasted much longer the grocers would cut off credit and the town would starve. But the gradual reopening of the copper mines after the ending of the coal strike staved off the calamity."

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Electric Mine Haulage

Letter No. 2—The difficulty cited by Charles F. Sherman, *Coal Age*, Nov. 27, p. 861, regarding the tendency of a mine locomotive to lift at its front end enough to allow the front wheels to spin, thereby throwing most of the load on the rear wheels and motor, will be interesting to all motormen, as this is a common trouble, particularly in mines where the loads must be hauled up a grade.

One of the largest coal mines in this country used a 6-ton electric haulage motor on a run having a fairly stiff grade against the loads. The motor gave fair satisfaction, until that section of the mine in which it was employed became enlarged and the size of the loaded trips increased. Even then the locomotive worked all right on the level track, though it was just able to creep over the top of the grade with a loaded trip attached.

It was the practice, in that mine, for the motorman to ride on the rear end of his machine, while the snapper rode on the front end. This snapper thought it quite a joke to jump off the front end when the locomotive slowed down on nearing the top of the grade. This, of course, increased the trouble and both the motorman and snapper would then have to go back one or two cars and push. With this assistance, the locomotive was just able to make the top of the grade and land the loaded trip.

When this condition became known to the mine foreman, he ordered the 6-ton locomotive taken to another section of the mine where the work was more suitable for a light machine and where it gave no further trouble. A heavier locomotive was then placed on this run and had no difficulty in hauling a loaded trip of cars to the top of the grade, without manifesting any tendency to lift at its front end.

Locomotive Too Light for the Work

It is clear that the 6-ton locomotive, in this case, was too light for the work it had to perform in the section first named. It so happened, however, that there were 40 or 50 electric haulage locomotives at work in this large mine. These machines varied, in weight, from 6 to 30 tons each, their heights also varied to suit the particular conditions in the sections in which they were employed, and the lower machines were mostly used in pillar workings where the roof was low.

While it was an easy matter, in this mine, to transfer a light motor that failed to perform the required work on one run, and replace it with a heavier machine that was adapted to the service, there are many small mines, employing but a few locomotives, where it would not be possible to overcome the difficulty as readily.

For example, the Northwestern Improvement Co.'s Mine No. 3, at Roslyn, Wash., a while ago, was operating a light machine on a grade where it had difficulty in handling the loaded trips. No trouble was found in hauling the load on the level track; but when the trip reached the grade, the front end of the locomotive had a tendency to lift. In other words, the weight of the machine was transferred, in part, to the rear wheels, which reduced the tractive force of the front wheels and caused them to slip on the rails.

Weighting the Head End to Prevent Lifting

Though the motorman, in this instance, was a young man, he reasoned that if the front end lifted, the proper remedy was to weight it down. Accordingly, he loaded that end of the locomotive with from 800 to 1000 lb. of rock, which answered the purpose intended and held the front wheels to the rails so that they exerted their full tractive force. The locomotive was, of course, overloaded, but the grade was for a short distance only and the overload was not a great objection.

The proper and practical remedy to apply when a loaded trip of cars hauled up a grade has a tendency to lift the front end of the locomotive and thus reduce the tractive force of the machine is to use a larger and heavier machine on that run. Weighting the front end of the machine will give relief, but it has the disadvantage of requiring the hauling of that amount of dead load, which is of benefit only on the grade.

California, Pa. RALPH W. MAYER.

Mine-Haulage Proposition

Letter No. 8—If not too late, kindly permit me to refer to the discussion of the mine-haulage proposition, regarding which I estimated, in my letter, *Coal Age*, July 10, p. 70, that the method I advocated might result in a "saving of 65 tons a day," by increasing the output of the mine this amount. I stated further that, based on the market value of $3 per ton, this would mean an increased revenue of $3 \times 65 = \$195$ per day.

Commenting on this remark of mine, Andrew O. Bain, in his letter, Sept. 4, p. 417, thinks I am in error in not allowing for the increase in the charges, particularly the mining of the extra 65 tons a day. Mr. Bain estimates that, in his opinion, the taking of these charges into account, would reduce the value of the extra tonnage to $2 per ton, and the increased revenue would be $2 \times 65 = \$130$ per day, instead of $195 per day.

Mr. Bain will allow me to draw his attention to my closing remarks, in which I suggested that if my estimate were even cut in two, I would consider the investment required to make the change in the haulage road a good one. Observe that the making of this allowance reduces my estimated value per ton 50 per cent, making it $1.50 per ton, which is 50c. a ton less than Mr. Bain's figure. To my mind, this makes a

very generous allowance for whatever increased charges are made necessary by reason of the increased output.

Let me say it is my belief that there will be no necessity for increasing the mine equipment and providing new mine cars or even increasing the dayhands employed in the mine. It is important to notice, also, that hauling the increased tonnage over the shortened haulage roads will require no increase of motormen, tripriders or drivers, as the case may be, though it may require one more driver on the gathering haul.

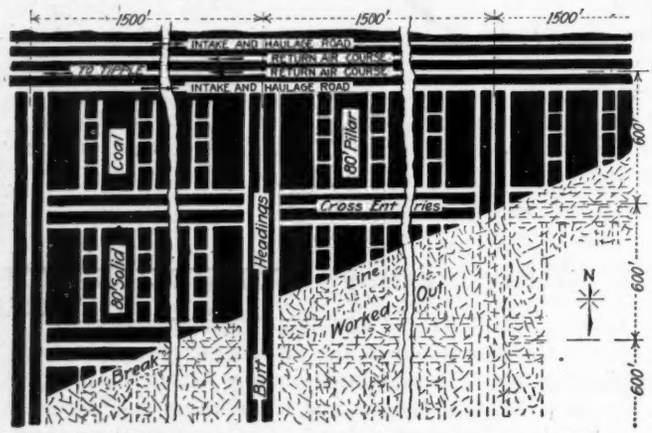
The shaft-bottom men will be able to handle the increased tonnage without difficulty. It is clear that, owing to the shorter haul, the mine cars will be returned to the working face more quickly and, perhaps, even a less number of cars will be required than formerly. With this explanation, Mr. Bain will certainly agree that my "error," if such it be, was on the right side.

Pocahontas, Alta., Canada. J. H. McMILLAN.

Problem in Coal Extraction

Letter No. 12—Kindly permit me to correct a statement in my previous letter, *Coal Age*, Oct. 16, p. 662, in respect to the manner of working out the coal in the several panels. In that letter I do not seem to have made my meaning clear and desire, now, to submit the accompanying sketch, which shows plainly the manner of working the panels.

As previously described, the main entries are first driven, north, south, east and west from the shaft,



REVISED PLAN OF WORKING OUT PANELS

dividing the property into four quadrants or sections. The plan, however, shows only a portion of the southeast section of the mine.

After driving the main entries four abreast and turning butt headings off these, three abreast, on 1,500-ft. centers, cross-entries are driven three abreast, on 600-ft. centers, off the butts and parallel to the main headings. The work of taking out the coal in the several panels thus formed should be started at the far end, in the southeast panel of this section of the mine.

The entire work of extracting the coal is on the retreating plan. In the discussion of this question, I understand that what is desired is a greater recovery of the coal. The cause of failure to obtain a large recovery in mining is chiefly due to attempting to take out too much coal in the first working. In reality, narrow entries or stalls should be driven to the point where it is desired to start the work of extraction.

The correction I desire to make is the following: Starting in the southeast panel, drive 8-ft. stalls, in pairs with 12-ft. pillars in each pair, and leaving 80-ft. pillars of solid coal between the several pairs of stalls. These stalls are driven up in each panel, by driving crosscuts on 40-ft. centers in the 12-ft. pillars. As the stalls reach the limit, the work of drawing back the 80-ft. pillars of solid coal is commenced and carried on the retreating plan.

WORKING THE PANELS FROM THE BUTT HEADINGS

Another plan of working the panels, other than that shown in the figure, and which I prefer as giving a more uniform breakline, is to drive the 8-ft. stalls in pairs with 12-ft. pillars in each pair and 80-ft. pillars of solid coal between them as before, only starting these off the butt headings and driving them west parallel to the main entries, instead of north as shown in the figure. This plan, also, reduces both the amount of narrow work and the distance of haul, besides giving an earlier development.

In either plan, back haulage is employed in all the sections. Practical experience has demonstrated that this is a sure and profitable method of extracting coal and obtaining a large recovery under the conditions named.

Before closing, let me state that the crosscuts in the 12-ft. pillars will require no extra track and afford shelter for the men.

Harmarville, Pa. C. W. ATKINS.

Letter No. 13—After reading the different letters that have been written on the problem of getting the largest possible extraction of coal in working a seam, I want to ask to explain my own method, which I believe has many advantages and will prove to be both safe and economical in working.

In order to make my meaning clear, I have prepared the following sketch, showing a single panel lying between the 3 N and 4 N entries off the main east. As shown in the figure, the north headings are driven three abreast, or on the triple-entry system, while the cross-entries are driven, in pairs, between them. The distance from the 3 N to the 4 N is about 900 ft., making a panel of solid coal of the same width, which allows for two 60-ft. barrier pillars, one on each side of the panel, to protect the headings, and permits the driving of 16 rooms on 50-ft. centers, the rooms being 32 ft. wide, with 18-ft. pillars between them.

This arrangement will give sufficient work to keep one machine busy on each cross-entry; or, as indicated in the sketch, one machine can work on each side of the panel. The arrows show the circulation of air in each machine section. The air being deflected by a canvas curtain to the face of No. 1 room on the intake and, passing through the breakthroughs at the faces of these rooms, enters the last room on the return and circulates back through these rooms to No. 1, from which it passes out onto the main return heading.

In every case, the center heading is the main intake air-course, the two side headings being used as return entries and the coal hauled out on one of them. As shown in the figure, crossovers for all track are driven at an angle of 45 deg., which provides easy curves on the haulage roads. Overcasts are built on the main intake heading where the haulage road crosses that air-course.

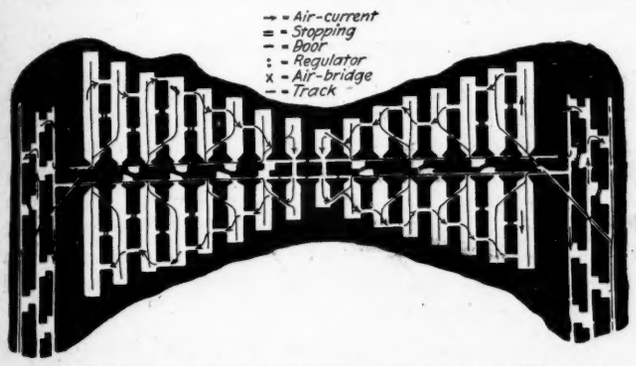
Also, as shown in the figure, the crosscuts in the

20-ft. entry pillars are driven from each entry in such manner that the rib of one crosscut corresponds to the center line of the other. Driving these crosscuts 18 ft. wide gives a good machine cut and saves yardage, while the opening at the center of the pillar is only 9 ft. wide, which gives a good opportunity for building the stoppings in that opening.

Another feature that has advantage is the driving of the first crosscut in No. 1 pillar and each alternate pillar, at a distance of 30 ft. from the entry, while the first crosscut in No. 2 pillar and each alternate pillar is driven at a distance of 60 ft. from the entry. After driving these crosscuts on a 45-deg. angle, the remaining breakthroughs are driven 60 ft. apart throughout the length of the room.

As indicated by the heavy line representing the track in the figure, entry switches are laid only at the mouth of each alternate room, starting with No. 1, and these are the permanent switches on the entry. A temporary switch is then laid at the mouth of each next adjoining room, but as soon as the breakthrough is driven between two rooms, the temporary switch is taken up and laid in the first room, just inside its mouth, so as to enable a track to be run through the crosscut into the adjoining room.

This system has the advantage of requiring only



SHOWING SYSTEM OF TRACKS IN A PANEL

one-half the number of switches on the entry and is a good plan in motor haulage particularly, or when mules are employed. Staggering the breakthroughs in the rooms and in the entry pillars, as I have described, is of particular advantage in working under bad top.

Driving rooms 32 ft. wide has a certain disadvantage in loading coal at the face, unless the track can be shifted over to either side. If this is impracticable, I would recommend a double track approaching the face. It will generally prove an advantage, however, to lay a double track in each room, laying one track along each rib. This will enable the drawing back of the pillars more quickly than where a single track is laid up the center of the room.

When starting to draw back pillars in a panel, I would double my force of men, in order to perform this work more quickly. There is much to be considered in drawing pillars. Under shallow cover, roof falls may admit surface water to the mine. On the other hand, at a greater depth of cover, the excessive roof pressure may cause a squeeze. Better results are always obtained where the pillars are drawn back quickly.

As each panel is worked out and nearing completion, work on the next panel should be started. A new overcast will then be required on the main intake heading, which will do away with the previous one, that being taken down and the crossover closed with stoppings. In the end, when the 60-ft. barrier pillars and the entry pillars are drawn back, this method should give a 100 per cent extraction.

Harrisburg, Ill. G. D. YORK.

[This letter will close the discussion of "Problem in Coal Extraction."—Editor.]

Promotion of Ambitious Workers

Letter No. 7—Of the many questions discussed in *Coal Age*, one bearing on the promotion of ambitious workers must prove not only interesting but have besides an educational feature. Especially is this true in respect to those whom it directly concerns. In my own experience, I will say that the matter of looking forward to promotion has caused me to spend much time in thought and has stimulated my efforts in the performance of work.

For the encouragement of the ambitious worker let me remind all such that their efforts in seeking promotion will meet with ultimate success if such efforts are honestly put forth. Success may be slow but it will come sooner or later if the worker retains his ambition and does not become discouraged.

Let me suggest just here that the worker examine carefully his environments to ascertain, if possible, what it is that is retarding his success. In most cases it is my belief that he will find the fault is his own. It is human to think that the foreman or superintendent has slighted a worker whose ambition has led him to expect early promotion. It may be there are others equally ambitious and expectant. The promotion can not go to all and patience and perseverance are factors in success.

AMBITIOUS AND WILLING WORKER AT TIMES HANDICAPPED BY JEALOUS BOSS

It is well known that failure to receive merited promotion may be due to the fact that another worker jealous of the success of this one may be pulling against him. It may be that the competitor for promotion has a friend in a position to speak for him and the result is an injustice may be done to one who is more deserving.

At times, the boss himself in immediate charge of the work, fearing the ambition and capabilities of a worker in his employ, will think that of necessity he must belittle the accomplishments and work of this man in order to prevent him from gaining too much ground and even surpassing himself in the race for promotion. How much better would it be, in such a case, for the boss to recognize the capabilities of his worker and make him an assistant, giving him charge of a portion of his work. This would show the desire of the boss to attain the highest efficiency and make himself the more valuable to the company. Jealousy in workers can never prove their efficiency but instead will show an incapacity that must lower his standing in the estimation of the company.

I have long realized how discouraged and discontented truly ambitious workmen, especially ambitious miners, must become when the way is blocked to them by conditions beyond their power to overcome. However, let me suggest that the difficulties in the way are often assumed and that, to my mind, is unwarranted. Rather let the ambitious worker look on the bright side and his chances of success will be greatly improved. The man who continually thinks that everything is

against him is not the one who attains the greatest measure of success. But, on the other hand, the man who takes things as he finds them and pushes forward with the same determined spirit is the man who will eventually find his place. He is of value to the company and a credit to himself.

It is true the ambitious worker should not fail to let his ambition be known so that his capabilities can be rightly judged. As I recall a recent writer stated that what a man wants he should seek to gain. In other words, if a man wants promotion let him get after it. Nothing will be gained by lying down on the job expecting promotion to come unsought.

Linton, Ind. W. H. LUXTON.

Finding a Mine Door Set Open

Letter No. 15—The letters that have been written on the question of a fireboss finding a mine door set open have been interesting to me as showing how far short of proper discipline many mines are being operated.

I have tried to read these letters with some degree of patience; but, to my mind, this is not a question to be discussed in the way of trying to show what the fireboss should do in such case. Instead, we should emphasize the fact that the mine door *should never be found set open.* A man who would prop a door open and leave it so, in a mine of which I had charge, would not work for me another minute.

In the first place, when a mine door is hung, the hinged post should be set plumb and the door should be made to fit close to the post. Then, by extending the lower hinge 1 in. or 1½ in. over the upper hinge, the door when opened will not remain so but will fall shut of itself. The lower hinge, as I have described it, should extend 1 in. or 1½ in. further beyond the edge of the door than the upper hinge, which will have the effect of tilting the door upward as it is opened and giving it a good fall so that it cannot remain open unless it is propped back.

SOMETHING WRONG IN THE MANAGEMENT

Returning to the question of a fireboss finding a door set open, let me say that something is radically wrong in the management of that mine. Either the foreman is asleep or he does not know what mine discipline means. The men have not been properly instructed, and there is not sufficient oversight given such matters in the working of a nightshift. If the door has been damaged by a driver so that it cannot be properly closed, it should be reported and repaired promptly.

As I stated before, it is not a question we should discuss in any shape or form, as it tends to uphold the foreman in his lack of discipline, or his failure to properly instruct his men regarding the importance of keeping all doors closed throughout the mine and the air current moving in its proper course. Ventilation is the first and most important rule in mining.

Referring to the statement of Robert A. Marshall, *Coal Age,* Nov. 6, p. 757, regarding detecting an open door by observing the water gage, I question whether he would be able to discover from the reading of the water gage that a mine door was standing open somewhere back in the workings. It is true if a heavy fall has taken place on the intake airway of a mine, the water-gage reading will show that something is wrong, and a good fireboss will proceed at once to find the trouble. But, where a door, back in the mine, is set open, I say that no fireboss can tell it by the reading of the water gage.

Oliphant Furnace, Pa. JOHN H. WILEY.

Letter No. 16—The discussion of how a fireboss should proceed when finding a mine door set open, which was started by the inquiry of Richard Bowen, *Coal Age,* Sept. 11, p. 462, has attracted much attention. Mr. Bowen states that it has been his "invariable practice" to leave an open door as he found it and proceed to examine the section, before closing the door and restoring the circulation therein.

It is my belief that such a procedure will not meet with the general approval of practical mining men, in considering a mine generating gas. The case cited by Mr. Bowen, though possible, does not offer a sufficiently strong argument in favor of attempting to enter and examine a gassy section in which the circulation has been destroyed.

Assuming that the mine in question and the section to be examined is gassy in a true sense, let me ask which is the lesser of two evils both of which must be considered; namely, entering a gas-charged section when knowing that the air is cut off, or closing the door and chancing the possibility of a burning gas feeder starting an explosion.

DANGER OF TRAVELING IN GAS-CHARGED AIR

One would not travel far in gas-charged air before the gauze of his safety lamp would become heated, making the lamp no longer safe. Again, assuming it as possible that a feeder is burning in the section, is it not true that the natural expansion of the gas in that section would have resulted in its ignition and explosion some time since? This latter consideration minimizes the possibility that there is a feeder still burning in the section.

Now, in regard to entering the intake and following the air when making an examination of a section, or entering the return end and proceeding against the air, my opinion is that whether the gas is explosive or otherwise, the safest plan is to follow the air.

Speaking of a gas feeder having been ignited by a shot, let me say, the firing of shots in a gassy mine should only be entrusted to thoroughly competent men whose duty it is to see that no gas feeders are left burning after firing each shot. Where this rule is strictly obeyed, the fireboss is assured that he can safely close the door and proceed with his examination.

Referring, again, to entering the return end, because of geological considerations, as suggested by Mr. Bowen, it must be admitted that a fireboss may be overcome by the poisonous gases of gob fires, which are not easily detected with a safety lamp. This may happen before he has proceeded any great distance. Or, he may find that the return air is charged with some considerable amount of methane, and as it would be dangerous for him to proceed against such a current, he would be compelled to return and enter the intake. The old saying is, "The safest way is the best way," and this is particularly true with respect to our dealings with mine gases.

J. H. MCMILLAN, Supt.,
Pocahontas, Alta., Canada. Jasper Park Collieries, Ltd.

[This discussion will close with Letter No. 18, which is now on hand.—Editor.]

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Unaccountable Explosion

Kindly permit me to present, for the consideration of the readers of *Coal Age*, an instance that has caused not a little speculation here and kept us guessing as to its nature and cause.

An explosion occurred in a room where the pillar was being drawn. The mine is working the No. 7 or Upper Freeport seam, in the Cambridge district in Ohio. The pillar was being cut by machine and was nearly all extracted, the practice being to cut through, seven runs wide on the butt.

At the time of the occurrence, the men were making the second cut from the entry pillar and the coal was partly loaded out. The fireboss had examined the place about two hours before and had found "no gas," as he reported. It may be of interest, however, to say that there had been noticed an oil smell in this district for several weeks previous.

When the loader went to the face of the working place, holding his carbide lamp in his hand near to the floor, an explosion occurred, burning him severely and knocking down men out on the entry. The concussion was felt and the explosion heard by men working in other places.

This seam of coal is overlaid with a slate varying from 5 to 8 ft. in thickness, and above the slate is sandrock that has been found to give off small quantities of oil, nearly all through this district. The mine has given off very little marsh gas, which was seldom found or reported by the fireboss. Moreover, it is generally believed that this explosion could not have been due to the presence of gas.

My solution is that a fall of roof, which had occurred back in the waste between the time when the fireboss examined the place and the explosion occurred, had liberated possibly an unusual amount of this oil, which was vaporized from the floor. I believe that it was this vapor of the oil that was ignited and caused the explosion. At the time, there was a fair amount of air passing the place, though the velocity was not strong.

About one hour after the explosion occurred, the place was examined by two firebosses and the mineboss. A safety lamp held near the floor was extinguished; but this could have been the result of the afterdamp of the explosion settling to the floor. I want to ask if *Coal Age*, or any of its readers, can suggest the nature of the gas or what caused the explosion.

Buffalo, Ohio. MINE SUPERINTENDENT.

There are numerous instances on record of explosions of gas taking place under conditions such as are here described, the gas, or in some cases the dust, that exploded being ignited at the floor. The old idea that an ignitable mixture of gas and air must always be found at the roof of a working place has long since been found untrue. Experience has shown that gas will frequently be ignited at the floor of a working place; and, what seems equally at variance with former ideas, a lamp held at the roof will frequently be extinguished when no considerable amount of methane is generated and the extinction of the lamp could not be due to a body of pure gas unmixed with air.

Temperature plays a considerable part in determining the relative densities of gas and air, in mine workings. A warm fresh air current, entering a working place that is generally cooler, will travel along the roof, while the cooler air that may be charged with some gas occupies a position near the floor. It frequently happens that the warm air current entering a working place at the roof, proceeds from some hot abandoned workings and carries sufficient blackdamp to extinguish a light held at the roof.

Again, in other cases, methane may be given off from the floor of a seam and blackdamp issue from the roof. In either case, the gas will generally be found in a seemingly abnormal position with respect to its density. It must be remembered that the density of air or gas is a determining factor in its location, only in a quiet atmosphere that is not disturbed by a moving current. Also, one must consider whether the gas in question is coming from the roof, the coal, or the floor of the seam, in order to render an intelligent judgment of its nature.

It has been shown that where methane and carbon dioxide diffuse into each other in the strata, in the absence of air, the mixture though lighter than air will extinguish a lamp. This mixture has been properly called "flashdamp," because it gives a brief cap on the flame of a safety lamp when first the lamp is raised into the gas, but which as quickly disappears. Hence the name flashdamp.

In answer to the question asked as to the nature of the gas that was ignited, or what caused the explosion in the case before us, it is possible only to surmise. The suggestion that the vaporized oil may have been ignited and exploded with the force described by our correspondent is hardly reasonable, as such a condition would require an atmosphere that would seldom, if ever, be found in a coal mine where the strata produced but small quantities of the oil.

James Ashworth, mining engineer, however, has advanced a theory that the coal formations may contain, at times, certain liquid hydrocarbons that vaporize immediately upon exuding from the strata, and form explosive conditions in mine workings subject to such emanations, which he admits are rare. It is claimed that the result of such an emission of vaporous hydrocarbons is similar to a large outburst of gas.

In the present instance, our opinion is that the explosion is due to gas that came from the floor, or accumulated there by reason of its relative density, being probably forced down by the cooler air at the roof. We should be glad to have the opinions of others.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Illinois Examinations Held at Springfield, Nov. 11, 12, 1919

(Selected Questions)

MINE EXAMINERS' QUESTIONS

Ques.—The water gage, in a certain mine, is 1.5 in. and the quantity of air in circulation 85,000 cu.ft. per min.; find the horsepower on the air.

Ans.—The unit pressure corresponding to a water gage of 1.5 in. is $1.5 \times 5.2 = 7.8$ lb. per sq.ft. The power on the air, in mine ventilation, is found by multiplying the quantity of air in circulation by the unit pressure; thus, $7.8 \times 85{,}000 = 663{,}000$ ft.-lb. per min. The horsepower on the air is then found by dividing this result by 33,000, since 1 hp. is the equivalent of 33,000 ft.-lb. per min.; thus, $663{,}000 \div 33{,}000 = 20.09$ *hp.*

Ques.—(a) What is a barometer? (b) Under what conditions can it be used to advantage? (c) At what season of the year are mines that are dry the most dangerous?

Ans.—(a) A barometer is an instrument used to measure the pressure of the atmosphere. The most reliable instrument for this purpose is the mercurial barometer shown in the accompanying figure. This consists of a glass tube closed at one end and open at the other. The tube being first filled with mercury is inverted and its open end immersed in a basin or vessel of mercury. The surface of the liquid in the basin being exposed to the pressure of the atmosphere, the column of mercury in the tube now sinks to a level such that the weight of the mercury column is supported by the atmospheric pressure acting on the surface of the mercury in the basin, there being a vacuum or no pressure at the top of the tube. Since each cubic inch of mercury weighs 0.49 lb. and the height of the mercury column supported by the atmospheric pressure at sea level, under normal conditions, is 30 in., the atmospheric pressure at sea level is $30 \times 0.49 = 14.7$ lb. per sq.in.

MERCURIAL BAROMETER

(b) The use of the barometer is a practical advantage, in the operation of a mine, by showing the changes in atmospheric pressure as they occur. A careful study of these changes in pressure, in connection with the gaseous condition of the mine workings, enables a more intelligent arrangement and control of the ventilation, and will often forecast a dangerous gaseous condition existing in the mine, owing to a rapid fall of the barometer.

(c) In the winter season, the intake current has a temperature above that of the mine. As a consequence, even though the intake air is saturated with moisture or nearly so, the rise in temperature when it has passed into the mine, increases its capacity to absorb moisture in the workings, since the capacity of the air for holding moisture is greatly increased by a rise in its temperature. This has the effect of rendering the mine workings dry and dusty and increases the danger due to the fine dust being raised and held in suspension in the mine air. In the summer season, the temperature of the intake current is generally higher than that of the mine.

Ques.—If the pressure producing ventilation is equal to 13 lb. per sq.ft., what is the water-gage reading?

Ans.—The pressure producing ventilation is the unit pressure (lb. per sq.ft.) in the fan drift. Then, assuming the required water-gage reading is taken in the fan drift where the pressure is 13 lb. per sq.ft., the corresponding gage reading is $13 \div 5.2 = 2\frac{1}{2}$ *in.*

MINE MANAGERS' (FOREMENS') QUESTIONS

Ques.—The bearing of an entry taken from a mine map is S 75° W and the declination of the compass, $5\frac{1}{4}$ deg. E. How would you give sights on this entry with a plain compass?

Ans.—The declination of the compass being $5\frac{1}{4}$ deg. E, means that the north point of the magnetic needle is deflected $5\frac{1}{4}$ deg. to the right of the true meridian. In other words, the needle is setting in the northeast and southwest quadrants, and a magnetic bearing, in either of these quadrants, if greater than the declination, is less than the true bearing by the amount of the declination. Therefore, in this case, the magnetic bearing corresponding to a true bearing of S 75° W is S $69\frac{3}{4}$° W.

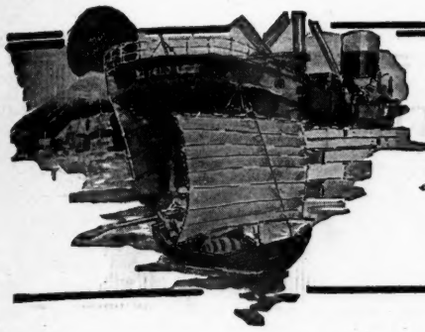
Ques.—The diameter of the piston of an engine is 10 in. and the length of stroke 15 in.; the engine makes 250 r.p.m. with a mean effective steam pressure of 40 lb. per sq.in. What is the horsepower of the engine in this case?

Ans.—The sectional area of the 10-in. cylinder is $0.7854 \times 10^2 = 78.54$ sq.in. and the total pressure on the piston is $40 \times 78.54 = 3141.6$ lb. For a length of stroke of 15 in. ($1\frac{1}{4}$ ft.), at a speed of 250 r.p.m., the piston speed is $1\frac{1}{4}(2 \times 250) = 625$ ft. per min. Therefore, the indicated horsepower of this engine is $(3141.6 \times 625) \div 33{,}000 = 59.5$ *hp.*

Ques.—(a) Give the breaking strain of a $9\frac{1}{16}$-in. crucible, cast-steel, hoisting rope, having 6 strands of 19 wires each. (b) State the safe working load, using 5 as a factor of safety.

Ans.—(a) The breaking strain of a 1-in. crucible, cast-steel, 6-strand, 19-wire, hoisting rope is 39 tons. Therefore, the breaking load of a $\frac{9}{16}$-in. rope of the same kind of material is $39(\frac{9}{16})^2 = 12.31$ tons.

(b) Using a factor of safety of 5, the safe working load of this rope is $12.31 \div 5 = 2.462$, say $2\frac{1}{2}$ tons.



FOREIGN MARKETS AND EXPORT NEWS

Coal Exports Again Restricted

Restrictions have again been placed upon shipments of bituminous coal abroad, announcement of which is contained in the following authorized statement by L. W. Baldwin, regional director of the Allegheny region, with headquarters at Philadelphia. "The Regional Coal Commission of the Allegheny region has found it necessary again to place restrictions on exportation of bituminous coal. This is due primarily to the threatening shortage of coal for domestic purposes brought about by a combination of circumstances.

"At a meeting of the Regional Coal Committee Friday it was decided that until the domestic requirements are fully taken care of, favorable action will be withheld on any application for a permit for coal to be exported. It is expected, however, that it will not be necessary to continue these restrictions very long as every effort is being made by the Railroad Administration to expediate the return of the empty coal cars to the mines and quicken in general the movement of coal."

Coaling Facilities at Durban, South Africa

The *South African Mining Journal and Engineering Record* devoted considerable space in its October (1919) issue to a description of the new coaling installation at Durban. This article is quoted below as of special interest to American shippers in view of the direct steamer traffic between South Africa and the United States which was an outgrowth of the war:

The development of the Natal Coal industry, and particularly the expansion of the export and bunkering trades at Durban, has called for improved coaling facilities at that port. The equipment existing there to-day has a maximum capacity of about 1,400 tons per hour, but when the railways are in a position to deliver more coal and satisfy the demands of shipping the present equipment will require considerable extension.

Natal was the first of the South African States to discover coal (in 1838), and mining commenced in 1888. The Cape Colony commenced mining in 1865, the output then being 16,500 tons, which amount had increased in 1899 to 208,655 tons. The Cape Colony's output after that date has been comparatively insignificant as compared with that of Natal and the Transvaal, which latter commenced mining in 1893. The development of the coal industry has been and will continue to be most beneficial to Natal, as it will result in largely increasing traffic to the coast. Railway facilities to-day are much improved since the early days of the coal traffic, but there is a great dearth of rolling stock. In 1907 it took 90 hours for the coal to travel from the mines to the harbor, and to-day it can be conveyed in 70 hours.

The progress of the port of Durban since the days of the Boer war has been most gratifying. In those days mail steamers and smaller craft lay outside the harbor and cargo was unloaded thence into lighters. Now, the mail steamers and larger vessels come inside and are unloaded alongside the wharf. This advance may be attributed partly to the great increase in the coal industry at the port. About the year 1905 it was found that the old methods of coaling, by means of baskets, were altogether inadequate; designs were therefore got out for a coaling plant, which was erected in 1907, and this plant has done excellent service during the last 10 years.

In 1913 it was decided that a new coaling plant was necessary, partly as an extension and partly to take the place of the old one should anything go wrong with it. This new plant was to have been erected in 1915, but owing to the outbreak of war that was rendered impossible. In 1917, however, the plant was completed.

Coal Exports for November

Exports of coal and coke as reported by the Department of Commerce for November, 1919, and the figures for November, 1918, as finally revised, are as follows:

EXPORTS OF COAL AND COKE
(In tons)

	November 1918	1919
Anthracite	430,369	320,719
Bituminous	1,616,914	724,650
Exported to:		
Italy	.....	45,933
Canada	1,384,147	336,641
Panama	3,188	8,482
Mexico	9,475	8,932
Cuba	99,679	59,835
Other West Indies	21,028	10,345
Argentina	1,168	19,954
Brazil	59,247	24,699
Chile	25,335	.....
Uruguay	10,321,000	17,653,000
Other countries	3,326	192,176
Coke	146,647	66,873

	Tons	Value
Total	724,650	$3,718,316
Anthracite	320,719	2,828,372
Coke	66,873	540,234

Bituminous

Port:	Tons
Italy	45,933
Canada	336,641
Panama	8,842
Mexico	8,932
Cuba	9,835
Other West Indies	10,345
Argentina	19,950
Brazil / Chile	24,609
Uruguay	17,653
Other countries	192,176

DOMESTIC EXPORTS OF COAL AND COKE FROM THE UNITED STATES BY COUNTRIES AND BY CUSTOMS DISTRICTS. BUNKER COAL SUPPLIED TO VESSELS IN THE FOREIGN TRADE AT SPECIFIED DISTRICTS DURING NOVEMBER, 1919

	Coal		Coke
Countries	Anthracite Tons	Bituminous Tons	Tons
Austria-Hungary	30	212	200
Azores and Madeira Is.	.....	17,857	.....
Denmark	.....	5,705	.....
France	1,697	64,338	.....
Germany	.....	7,905	.....
Gibraltar	.....	9,533	.....
Italy	13	45,933	924
Netherlands	.....	36,950	8,308
Norway	2	.....	37
Portugal	20	.....	.....
Spain	680	.....	.....
Sweden	100	16,247	.....
Switzerland	.....	17,417	4,290
Bermuda	1	3,719	5
Canada	301,773	336,641	19,945
Guatemala	.....	2	.....
Honduras	.....	235	.....
Panama	.....	8,482	.....
Salvador	.....	.....	2
Mexico	159	8,932	20,464
Miquelon, Langley, etc.	25	.....	.....
Newfoundland and Labrador	5,270	.....	.....
Barbados	80	6,510	.....
Jamaica	.....	1,664	.....
Trinidad and Tobago	2	.....	12
Other British West Indies	1	.....	.....
Cuba	5,525	59,835	278
Danish West Indies	.....	958	1
Dutch West Indies	.....	851	.....
French West Indies	.....	.....	11
Haiti	1	.....	2
Dominican Republic	3,852	362	.....
Argentina	.....	19,954	.....
Brazil	995	24,699	.....
Chile	91	.....	12,237
Colombia	.....	.....	3
Peru	400	3,814	40
Uruguay	.....	17,653	.....
Venezuela	2	.....	14
Dutch East Indies	.....	.....	100
British East Africa	.....	6,174	.....
French Africa	.....	2,068	.....
Total	320,719	724,650	66,873

	172	173	174
	Coal		Coke
Customs Districts	Anthracite	Bituminous	
Maine and New Hampshire	124	1	182
Vermont	1,496	78	33
Massachusetts	411	.....	.....
St. Lawrence	77,829	28,521	1,212
Rochester	37,478	5,878	237
Buffalo	178,546	89,379	8,828
New York	15,585	2,077	1,585
Philadelphia	6,025	78,933	8,898
Maryland	91	35,523	15,937
Virginia	.....	238,471	1
South Carolina	.....	11,089	.....
Florida	.....	12,208	.....
New Orleans	20	490	80
Sabine	.....	.....	31
San Antonio	49	846	277
El Paso	103	4,610	3,659
Arizona	2	3,419	16,455
Southern California	5	10	.....
San Francisco	.....	2	4
Washington	.....	101	.....
Alaska	.....	1,877	.....
Dakota	905	7,737	180
Duluth and Superior	1,937	7,756	114
Michigan	102	34,919	8,848
Ohio	11	160,394	311
Porto Rico	.....	331	1
Total	320,719	724,650	66,873

BUNKER COAL

Customs Districts:	Tons
Maryland	30,099
New York	277,270
Philadelphia	43,420
Virginia	122,693

Shortage of Coal in Canada

America's bituminous coal strike is seriously affecting the foundries throughout this country, states a trade report from Canada. The non-shipment of coke from the United States into Canada is aggravating this situation rather more than the scarcity of bituminous coal, as coke is largely used for molding purposes. There are some foundries engaged largely in the turning out of car wheels, and large quantities of coke are used for this purpose.

Users of coke in Canada have been living on a hand-to-mouth policy, and they have practically no reserve of coke on hand. Manufacturers who use bituminous coal are more fortunately situated, though inquires reaching the Manufacturers' Association and the Fuel Controller are multiplying from these sources in which some anxiety is expressed with regard to the future. No bituminous coal has come into Canada in any considerable quantity for over a month, and though many of the manufacturers seem to have sufficient supplies to do them for from one to three months, they are becoming somewhat apprehensive that their situation beyond that time may develop unfavorably if the American strike is not settled and production commences on a large scale, to make up for the time that has been lost. Some time ago the Manufacturers' Association sent out a letter advising manufacturers how they could secure coal if it was absolutely necessary. Advantage has been taken of this assistance in the case of coal, and now that foundries have been threatened, at least one foundry has already applied for information which would help it to secure needful supplies.

On the whole, there is a growing anxiety over the situation, though there seems to be no immediate danger of a dislocation of industry on account of coal shortage.

Coal Bunkering Prices at Foreign Ports*

	Price per Ton
Gibraltar	$24.80
Algiers	28.25
Malta	28.06
Oran (15c.)	28.63
Port Said (plus Emergency Tax)	29.02
Newcastle	16.20@17
Southampton	20.00
Liverpool (Welsh coal)	20.38
Plymouth	20.00
Hull	9.60@10.50
Fowey	19.43
London-Gravesend	20.85
Dartmouth-Portland	121/6
Cardiff (according to quality)	751/ to 100
Swansea	10.40
North of Scotland	No coal available
Copenhagen	32.20
Trondjem	26.75
Gothenborg	32.20
Amsterdam	26.25
Rotterdam	26.25
Antwerp (Bascoup)	26.60
Antwerp (American)	34.42
Havre, Bordeaux	No coal available
Azores	26.60
Madeira	24.00
Teneriffe	25.00
Las Palmas	25.00
St. Vincent	24.60
Barbados	20.85
St. Lucia	20.85
Trinidad	20.75
St. Thomas, V. I.	20.75
Bermuda	25.00
Curacao, D. W. I.	22.00
Rio de Janeiro	29.00
Pernambuco	31.40
Bahia	31.40
Santos	29.50
Rosario	28.00
Bahia Blanca	27.20
Buenos Aires	27.55
La Plata	27.55
Montevideo	27.55
Coronel (approximate)	26.60@13.50
Delagoa Bay	6.50
Port Natal (according to quality)	6.85@7.25
Cape Town (according to quality)	7.50@8.50
Dakar	25.50
Singapore (according to quality)	17.50@17.85
Colombo (according to quality)	14.80
Aden (So. African or Indian coal)	20.85
Bombay (Welsh coal)	10.25
Karachi	10.10
Newcastle	27.40@29.50
Port Kembla	3.45
Adelaide	6.75
Albany	8.20
Fremantle	8.20
Melbourne	6.10
Sydney	5.00
Sydney Harbor	4.00
Port Pirie	6.50
Barcelona	37.80
Valencia	37.80
Castagena	36.75
Malaga	36.75
Huelva	34.75
Corunna	34.00
Bilbao	31.20
Pasages	31.20

* In compiling this table the foreign exchange on Dec. 20 was: Shilling worth 19c.; peseta, 19.4c.; kronen, 19.5c.; guilder, 37.5c., and a rupee, 46.5c.

* Plus 19c. Export Duty

Ulster Coal Fields Promise Well

Concerning the coal fields in Ulster, it was pointed out by the senior geologist, Geological Survey, Ireland, in the course of an address delivered in Dublin early in 1919, that the most promising coal field in this district was that beneath and around the southern half of Lough Neagh, and in this region two bores were being put down by the branch of the Ministry of Munitions known as the Department for the Development of Mineral Resources, which is located at Dublin.

If the coals known to occur in the Tyrone coal fields were found to extend over even a fraction of the area indicated by the geological reasoning the resulting coal output would be such as to revolutionize the industrial life of Ulster. An analysis of the geological structure of the north of Antrim indicated a fairly rich field there also—probably not so rich as that beneath Lough Neagh, but still well worth exploitation for future development.

In the Larne area also coal was likely to occur, but it was feared that the highly-faulted nature of the ground would make working difficult. A scheme has been outlined for continuing and extending the exploitations started by the Ministry of Munitions.

Ruhr Coal Output

The *Iron & Coal Trades Review* report that the statistics regarding the production of coal in the Ruhr from the beginning of the Revolution down to the end of October have now been published. They are given month by month, in tons, together with the number of men employed (these figures in brackets), and are as follows:—October, 8,457,360 (445,000); November, 6,205,596 (395,042); December, 5,773,060 (405,165); January, 6,263,070 (425,380); February, 5,430,776 (429,514); March, 6,299,591 (418,649); April, 2,132,007 (416,828); May, 5,826,873 (413,087); June, 5,007,977 (413,930); July, 6,703,416 (418,709); August, 6,504,494 (424,822); September, 6,580,219 (434,014); October, 6,945,901 (452,415).

It will be seen that there has been a constant increase in the number of men since June, and the average output per day has advanced at the same time, the average in that month having been 241,208 tons, and 257,256 tons in October. It has to be borne in mind, however, in considering these figures that many of the new men employed are unskilled, and that the shift was reduced from 8½ to 8 hours on Nov. 18 last, and to 7 hours in the strike month last April. The output in October was equivalent to an annual output of 83,500,000 tons, or 73 per cent of the quantity (114,500,000 tons) raised in the pre-war year 1913. A reduction in the 12 months under review is also shown as compared with 1914 and 1917, the output in the Ruhr district having been 98,300,000 tons in 1914, 86,800,000 tons in 1915, 94,200,000 tons in 1916, 99,100,000 tons in 1917, and 95,900,000 tons in 1918.

Shippers Secure Permits With Difficulty

Steamers can be had to carry coals to European ports at considerably less than the Shipping Board rates, but shippers are experiencing great difficulty in securing licenses, except for Shipping Board boats at Shipping Board rates. To South American ports, the same conditions apply, although shippers are now having the same extreme difficulty in securing permits, and to West Indian ports, rates are firmer.

The Shipping Board's rates by steam, are as follows:

Port	Rate	Tons of Displacement
Genoa/Leghorn	$26.50	1000
Spezia/Savona	26.50	1000
Piraeus	23.50	1000
Trieste/Venice	31.00	800
Algiers	26.00	800
Cadiz/Bilbao	23.50	1000
Barcelona	26.00	1000
Antwerp/Rotterdam	22.50	1000
Lisbon	22.50	1000
Gothenburg	24.00	1000
Marseilles	26.00	1000
Stockholm	26.00	800
Hamburg	25.00	1000
Rouen	23.00	1000
Malmo	25.00	800
Pernambuco	16.00	500
Bahia	16.00	500
Rio	17.00	1000
Santos	18.50	600
Rio Grande do Sul	19.50	500
Buenos Aires or	16.00	1000
La Plata or	or	
Montevideo	17.50	750
Rosario	19.00	750
Bahia Blanca	17.50	1000
Nitrate Range	14.00	....
Havana	7.50	600
Cardenas or Sagua	9.00	400
Cienfuegos	9.00	500
Gaibarien	9.50	300
Guantanamo	9.50	300
	9.00	400
Manzanillo	9.50	300
Bermuda	9.00	300
Bermuda p. c. and dis. free		
Kingston	9.50	400
St. Lucia	11.00	500
Barbados	11.00	500
Santiago	8.50	500
	9.00	400
Port of Spain, Trinidad	11.00	500
Curacao	10.50	500
Free p. c. Curacao		
Demerara	13.00	400
St. Thomas	10.00	500

All above rates gross from charter.

The exportation of anthracite and bituminous coal, briquets, and coke from Germany without special permit is made punishable with imprisonment under a proclamation dated Dec. 1, issued by the German Minister of Economics.

Industrial Coal in Belgium

The reviving industries of Belgium continue to be greatly embarrassed by lack of fuel supplies. Practically no foreign coal is arriving except the shipments from Germany stipulated by the Peace Conference, and these are said to be irregular and insufficient. Belgium is, of course, a large producer of coal, but much of it is unsuitable for industrial purposes. Furthermore, production of the Belgian mines is hampered on account of the shorter working day with the greatly increased compensation which has become general, and railway congestion, as states in a Department of Commerce report.

Coal is one of the chief products relied upon by Belgium to diminish its adverse trade balance, and during the first nine months of this year exports amounted to 233,586,611 francs. Stipulated deliveries of Belgian coal now are being made to certain foreign countries, Switzerland receiving 30,000 tons, Holland 10,000, Rumania, Argentina, and Italy 50,000, and France 320,000 tons per month. These heavy exports of course occasion a shortage and advance the price in the domestic market. As coal is one of the very few important raw materials that Belgium has in exportable quantities, it is likely that the Government will make every effort to continue exports so necessary from a standpoint of foreign exchange.

During the first eight months of 1919 exports of coal amounted to 2,650,000 tons, while September exports totaled 320,000 tons. In 1913 coal exports for the first eight months amounted to 3,300,000 tons.

The difficulties of coke production in Belgium, due to insufficient supplies of industrial coal from Germany and France, is indicated by the exports for the first eight months of the present year, which amounted to 210,000 tons as compared with 700,000 tons exported during the same period in 1913.

Coal in South Wales

From a report Consul W. F. Doty, Cardiff, Nov. 26, 1919, and later published in a report of the Department of Commerce, the announcement by the Government through the president of the Board of Trade of a reduction of 10 shillings per ton on inland coal has been most welcome in the South Wales and Monmouthshire district. It appears that this is based, not upon increased production but upon the profits from the export trade. At the rate of production during the past two weeks the output would be only 198,000,000 tons per year, which is considerably below the estimate of 217,000,000 tons stated by the president of the Board of Trade.

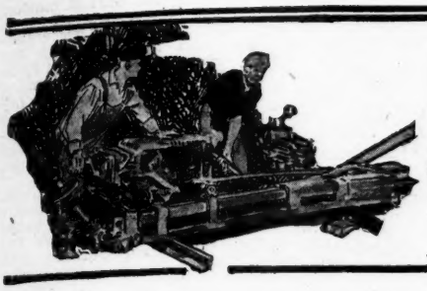
During the four months ended October, 1919, cargo exports of coal amounted to 11,005,183 tons at the rate of 33,000,000 tons annually, while bunkers amounted to 4,294,308 tons or at the rate of 13,000,000 tons a year. This would make a total of 46,000,000 tons annually, which is far in excess of the estimate by the president of the Board of Trade, namely, 32,000,000 tons a year. The value during the four months ended October, 1919, of cargoes of coal was £30,239,138, and of bunkers £11,809,347; total, £42,048,485.

The total for the year ending June, 1920, might therefore reach the sum of £126,000,000. The export trade in coal and bunkers has received added impetus from the American strike which enabled the United Kingdom to exploit markets that had been supplied for some time with American coal.

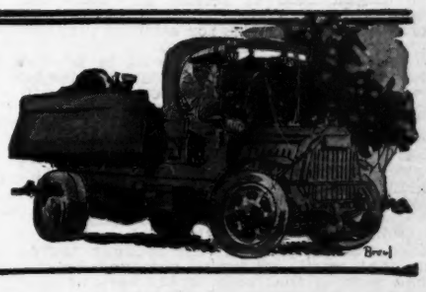
No Rolling Stock Shortage in Belgium

The situation remains unchanged, says the *Iron & Coal Trades Review*, there being no improvement yet in the rolling stock shortage. Stocks have been slowly accumulating at the mines since the middle of October, and fuel is still scarce; although the output for November has reached 98.6 per cent of the normal before the war. The working day has been reduced by half-an-hour since Dec. 1, and the festivals of the patron saints were celebrated as usual, hence there will be a serious falling-off in the output during December.

As regards coke, all export licenses remain suspended, and the scarcity of coal is limiting the output of the cokeries. The 80,000 tons of coking coal ceded to Belgium by France have not yet arrived. Prices are to remain in force until the end of the year.



COAL AND COKE NEWS



Charleston, W. Va.

General car shortage more acute and protracted than at any time last year. Thousands of loaded cars held in the East. Car supply from 50 to 60 per cent of normal in New River field. Embargoes added during the week. Similar conditions prevailed in Kanawha field. Producers falling further behind with orders.

The car shortage in this section of the state between Jan. 5 and 10 was even more pronounced than it had been during the latter part of the previous week. Indeed the first full week of the new year brought a car shortage more serious than had been observed at any time during 1919. Not only was the shortage more acute but it was more general and appeared to be more protracted than any other one during a period of 12 months. The shortage was so serious in fact as to vie with labor problems in importance and was the principal topic of conversation among producers not only in one field but in all fields.

It is extremely doubtful if the number of cars available in any field reached by the Chesapeake & Ohio, during the week ended Jan. 10, was above 60 per cent of normal. During certain parts of the week the supply was as low as 40 per cent. While the Sunday accumulation furnished some relief, such a supply was soon exhausted, and during the remaining five days of the week mines were hardly able to work more than half the time, so that there was a good deal of idleness among the mines in this area, tending toward disorganization and inefficiency and coming at a most inopportune time.

Producers claim that the present car shortage could be avoided if the railroads would cease holding coal, the report being in circulation that there are still thousands of cars in the East being deliberately held after having been diverted in transit; one effect of this has been to lead to further diversions of coal by the Railroad Administration, and this policy has brought sharp protests from producers and shippers in this section. On Saturday, Jan. 10, the supply of cars at Chesapeake & Ohio mines was not over 40 per cent.

Railroads have been unable to handle coal trains as promptly as usual through inadequate motive power and that also has tended to demoralize operations in several fields, interfering with the movement of coal and with the delivery of empties to mines, as sidings have been heavily congested.

Frequent embargoes imposed also tended during the week ended the tenth, to retard the shipment of coal either for domestic or export markets. Producers are complaining that shipping conditions do not warrant a continuance of the limitations upon export business.

While receipts from coal confiscated and diverted during the strike were somewhat larger during the period ended the tenth, large amounts were still outstanding and the names of final consignees had not been learned in many cases.

Complaint was general in the New River field during the week ended Jan. 10 of a car shortage. As a matter of fact up until Jan. 7, there had not been two full days of operations. The scarcity of cars in the New River field remained unbroken throughout the week above referred to, averaging from 50 to 60 per cent only of normal, and forcing mines in many instances to mark time while waiting for cars. Daily production in the New River field at Chesapeake & Ohio mines fluctuated between 18,000 and 20,000 tons a day.

Although limitations still existed as to the volume of New River coal which could be exported, it was found impossible even to ship up to the tonnage permitted owing to inability of mines to secure enough cars. Another factor which retarded export shipments was the addition of embargoes during the week. As might be expected there was an excellent demand for New River coal, but with a shortage of cars prevailing, producers were utterly unable to keep up with the demand.

An acute car shortage plus an embargo on shipments to Michigan and other points whittled down production very materially in the Kanawha region during the week ending Jan. 10. In that field there was not on an average, at any time during the week, more than half enough cars to insure full production at the mines, and during the latter part of the week the supply hovered between 40 and 50 per cent. On the tenth in fact there was only a 40 per cent supply and many mines were forced to go without cars. Production, in fact in the Kanawha field, was less than 100,000 tons for the entire week, at least insofar as mines on the Chesapeake & Ohio were concerned, running about 16,000 tons a day. To make matters worse a slide on the Coal River division of the Chesapeake & Ohio near Whitesville, in Boone County, forced a suspension of traffic on the Coal River branch and materially affected the production of coal.

Producers in the Kanawha region attribute the general car shortage to the fact that so much equipment is still tied up when as a matter of fact there is no longer an excuse for such conditions.

The demand for Kanawha coal was such as to far exceed the supply and owing to conditions already described producers were falling further and further behind with orders, and of course were utterly unable to take care of spot business, having no assurance of any relief from the car shortage.

Bluefield, W. Va.

Railroads in smokeless territory unable to supply empties demanded. Deficient motive power, great amount of coal still unloaded in the East and large number of cars retained in the West, the cause. Demand for coal portends general shortage. Situation in various smokeless regions. Export market strong, especially for gas coal.

Acute car shortages still prevailed in the several smokeless regions during the week ended Jan. 10, the Norfolk & Western, Virginian and the Chesapeake & Ohio all being utterly unable to supply the demand for empties (though the shortage was more pronounced further north), cutting down production to the extent of 25 or 30 per cent in the extreme southern part of the state and to the extent of about 50 per cent elsewhere in smokeless areas. As a result of the general prevailing scarcity of cars, the output in all regions was materially reduced as compared with the week ended the third. While railroads have been deficient in motive power, the absence of cars cannot be wholly attributed to that cause, the great amount of coal still unloaded in the East as well as the large number of cars still in the West being factors in the shortage. There is an especially strong demand for coal for export, especially gas coal, but limitations imposed are preventing any large exports of fuel, the permit of the regional director still being required as a prerequisite to shipping export coal.

Receipts of funds for coal diverted during the strike are beginning to be somewhat more plentiful, although a large amount of extra work is still being entailed in order to secure data concerning diversions and final consignees.

In many places scattered throughout regions in southern West Virginia, the car shortage was such that mines had no cars at all and consequently numerous shutdowns were reported. As a result of such conditions, mines are far behind in their deliveries, although there has been a steady increase in demand ever since the first of the year, and such an increase is regarded in many producing quarters as portending a shortage of coal throughout the country.

The supply of empties in the Winding Gulf field during the week ended the tenth was exceedingly weak, especially as to the Chesapeake & Ohio. It is stated that on Monday, the fifth, when there should have been a liberal supply of cars, it proved to be one day in the history of the Chesapeake & Ohio in the Gulf field, that mines had practically no empty cars. The car supply on the Virginian for the first two days of the week was excellent, but during the remainder of the week not more than half enough empties were furnished. Consequently, although there was a stiff demand for smokeless, the mines were utterly unable to take advantage of it. Of course with restrictions still existing as to exports, the volume of coal sent to tidewater for overseas shipment, was far below the prestrike level. As a matter of fact operators were unable to make contract deliveries. The labor situation was pronounced as being favorable to a large production.

Loadings were less in the Tug River field during the week ending the tenth than during the previous working period, dropping from 77,000 to 69,950 tons. A shortage of cars still exists as to this field and such a shortage, it is stated, cannot be blamed altogether on insufficient motive power, although that has held back the loading of coal to some extent. Approximately 20 per cent of the Tug River output is being moved to tidewater, a part of such tonnage being for export. Export coal can only be moved under permit from the regional director. The export demand is pronounced as being strong, especially for gas coal; one Bluefield representative of an exporting company now assembling fifteen thousand tons per week to run for seven weeks. This contract calls for gas coal which will probably come largely from the Thacker field.

As miners of the Pocahontas field had returned to work for the most part by Jan. 5, losses from a labor shortage, as compared with losses from the same cause during the previous week, had been materially reduced, but inability of the mines to secure an adequate car supply was still affecting production to about 25 or 30 per cent.

Huntington, W. Va.

Coal shipped to essential industries still being confiscated for railroad use. Causes much confusion. Serious car shortage in Logan field. Embargo on eastbound shipments imposes hardship. Increase in Chesapeake & Ohio transportation facilities would increase production in Logan and Guyan fields.

The most significant development in any of the volatile fields during the week ended Jan. 10 and subsequent to that period, has been the confiscation of fuel shipped under contract, notwithstanding the fact that the strike is over. A part of such coal is being confiscated for railroad use, and a large tonnage, moving on contract to public utilities and other essential consumers, is being taken indiscriminately by the railroads simply because (it is charged by operators) the railroads failed to make provision last summer for an adequate supply of coal. The action of the railroad companies is causing much confusion and is throwing industrial machinery out of gear, coal producers being particularly wrought up over this latest development.

The effect of a serious car shortage in the Logan field, during the week ended Jan. 10, was seen in greatly reduced loadings, only 3,558 cars of coal being loaded in the period just mentioned as against 4,194 during the previous week, a loss of 636 cars or approximately 31,000 tons. Such a loss was due entirely to the car shortage as labor conditions were conducive to a large supply. The failure of the Chesapeake & Ohio to furnish an adequate supply of cars was attributed to cold weather and the large number of Eastern cars still in the West.

An embargo on eastbound shipments from the Logan field, placed on the ninth, imposed a general hardship as it shut off contracts obtained in the East at a great expenditure of time and effort.

Little relief from present conditions in

the Logan field is looked for until the Chesapeake & Ohio increases its present facilities and provides for additional facilities for handling Logan coal.

The demand for Logan coal is beyond the ability of Logan producers to supply, and it is certain that such conditions will prevail for some time to come.

Large development work under way would increase production in the Guyan field at least fifty per cent in the next two years, but under present limited railroad facilities, such development will be at a standstill.

The shortage of cars on the Chesapeake & Ohio system during the week ended the tenth was reflected in the loading figures for that week; statistics compiled by the road showed that only 10,914 cars of coal or about 545,700 tons of coal transported as compared with 12,127 or about 606,350 tons handled during the previous week, a loss of 60,650 tons, the biggest loss being in the Logan field.

Fairmont, W. Va.

Slump in production owing to drop in number of cars furnished northern fields. Coal goes to Eastern points. Emphatic protest at diversion of export coal for use of gas companies at Government prices. Payment for coal diverted during strike still seriously delayed.

There was a decided slump in production in the northern part of West Virginia during the weekly working period ended Jan. 10, owing to a drop in the number of empties furnished during the latter half of the week. The week gave promise of being an auspicious one from a production standpoint, since for a day or so cars furnished, somewhat approached normal, although it might be added that mines generally were ordering more cars to take care of the heavy demand. On Monday the fifth the supply available was virtually normal. Beginning with Thursday, however, there was a marked decrease, nearly fifty mines in the Fairmont region alone being idle on that day. On Friday the situation was even worse with more mines idle.

While a less number of cars were furnished on the tenth, they were more widely distributed, although nearly seventy mines were idle on the tenth. There was quite a lean supply on the Monongahela, partly relieved when more cars were furnished, after the issuance of a peremptory order from the manager of the Eastern Car Pool at Pittsburgh, to the Pittsburgh & Lake Erie, to provide more cars for northern West Virginia points. Late placements also figured to some extent, as being responsible for a curtailed production. Northern West Virginia operators claimed during the week, that the Central Coal Committee was still holding coal loads in the East in reserve, until after the Columbus convention of the miners, and that such a policy was limiting the supply to some extent at least.

The greater part of the coal produced in various northern West Virginia fields was being moved to Eastern points, and, while the bulk of west-bound coal was still being shipped to Ohio and Michigan, the tonnage was rather limited during the last half of the week. Curtis Bay shipments were increasing during the early part of the week but declined when production was reduced. The tonnage of coal shipped for railroad fuel was materially reduced, running far below recent weeks. Diversions of gas coal intended for export, for the use of certain Eastern gas companies at Government prices, brought emphatic protests from northern West Virginia operators; while they were not opposed to the diversion the operators did not feel that it was just to divert export coal at Government domestic prices. Producers were experiencing much difficulty during the week in securing the issuance of permits for the exporting of gas coal. In fact during the latter part of the week no such permits were issued.

Payment for coal diverted during the strike is still being seriously delayed according to reports from all parts of northern West Virginia. While information as to who received much of the coal diverted is being received, yet payment has not followed and even the railroads have been snail-like in settling for coal taken by them during the emergency.

Ashland, Ky.

Poof car supply reduces output to 49 per cent of capacity. Chesapeake & Ohio again discriminates in favor of mines furnishing railroad fuel. Commercial coal confiscated. Producers cannot supply strong market.

Production in northeast Kentucky was running 27,000 tons or 25 per cent behind the production for the same period last year, during the week ended Jan. 10 not through any lack of demand, as was the case during 1919, but solely because of an inadequate car supply. As a matter of fact the shortage in the northeast Kentucky region during the period named cost in production losses 120,000 tons, or 46 per cent out of total losses aggregating 51 per cent of capacity, the total output being only 49 per cent. It is claimed now by railroad officials that the poor car service is due to congestion at terminals. While such officials predict that there will be a larger production during the present month than at the same period in previous years, operators find little encouragement in that since conditions have always been sub-normal at this time, during the last three or four years from first one cause and then another.

The Chesapeake & Ohio has again returned to the policy of assigned cars or, in other words, is discriminating in favor of mines from which it obtains its fuel supply. In fact no bones have been made of the fact that car distributors have been directed to furnish mines in this region as well as in other regions an arbitrary full supply, the excuse being that the road is experiencing a severe shortage of fuel. It was also learned in Ashland on Monday, Jan. 12, that the Chesapeake & Ohio was confiscating commercial fuel, claiming that such action was necessary in order to move trains. The action of the Chesapeake & Ohio in discriminating in favor of railroad fuel-supply mines has been brought to the attention of the Railroad Administration by officials of the northeast Kentucky Associaton.

While the number of cars available on Jan. 12 and 13 was somewhat larger than during the previous week, northeast Kentucky operators were not sanguine of any permanent change for the better in transportation conditions. With mines falling so far behind in production, owing to transportation disabilities, it is being found impossible for producers to keep pace with the present strong demand in all markets.

Victoria, B. C.

British Columbia coal via Panama canal for Ontario and Quebec. Matter being considered. Engineer for Commission of Conservation discusses the situation. United States developing European markets. Changed conditions may allow British Columbia to aid eastern Canadian manufacturers. Canada no longer easiest market for U. S. coal operators. Restrictions on export of coal from Canada withdrawn.

The announcement that the Canadian Manufacturers' Association is to investigate the possibility of developing sufficient coal in Canada to meet the requirements of Canadian industry has given rise to the suggestion that the time may not be far distant when the coal of western Canada will find its way via the Panama canal to the St. Lawrence River.

On a previous occasion when the subject was broached, the statement was made in the East that British Columbia was too far away to be considered as a source of supply for manufacturing purposes in Ontario and Quebec. But with the changing conditions and the fact facing them that the United States may develop other markets for export besides Canada, the whole question probably will be reconsidered and the possibility of this province coming to the aid of eastern manufacturing concerns will be thoroughly investigated.

Arthur V. White, consulting engineer for the Commission of Conservation, in discussing this matter recently, said that the war had brought out the fact that nations which did not possess within their own borders coal and other fuel supplies, from which to derive light, heat and power, have found themselves in desperate straits. Formerly Great Britain was a heavy exporter of coal, especially to those European countries which either had no coal of their own or were only partly able to supply their requirements. But Great Britain is unable now to supply this demand.

Concerning countries which require coal, they have not only been making extreme efforts to produce fuel from all possible sources of their own, but have been looking outside to ascertain what are the maximum deliveries that may be secured from those countries fortunate enough to have coal for export. The United States, it was said, is stepping to the front as an exporter and Great Britain, among other countries, is looking to the United States for assistance in this respect.

"It is manifest, therefore," Mr. White said, "that Canada no longer occupies a favored position as being the easiest market for United States coal operators. It may be the easiest market insofar as transportation is concerned but there is the question of price. European countries have demonstrated the fact that they are practically ready to pay any price demanded, because it is so evident to those in charge of affairs of these countries that they cannot go on, either economically or in many instances even maintain physical existence, unless additional fuel is available.

"British Columbia, like her sister provinces on the Atlantic seaboard, possesses coal and waterpower both readily available at tidewater. When one comprehends the significance of the fact that countries like Italy and France have found it necessary to pay from $30 to $90 a ton for coal, it becomes evident that past considerations are not likely to have anything like the same weight, in appraising the value of British Columbia's coal fields to Canadian industry. Add to the present price the cost of haulage to practically anywhere in Canada, and the price of British Columbia coal per ton still may be found to be substantially less than the prices which European countries are prepared to pay."

All restrictions on the export of coal from Canada were withdrawn by the Fuel Controller of the Dominion on Dec. 31, 1919; instructions to this effect were received by W. G. Gaunce, Pacific Coast Fuel Controller, in common with occupants of similar office in other parts of Canada. The understanding, it was explained by Mr. Gaunce, was that this action would be taken simultaneously with the abolition of fuel control in the United States. On the Pacific coast there was no scarcity of coal for domestic or general use. The collieries continued production at a high pitch and it was possible to export considerable quantities from British Columbia without in any way affecting the local situation. In some sections of the prairie provinces a more or less embarrassing condition was threatened because of the possibility of a strike in District 18 (U. M. W. of A.). This however, did not develop and the critical period has passed.

PENNSYLVANIA

Anthracite

Scranton—Plans for the new breaker to be erected by the Delaware, Lackawana and Western company to replace the present Bellevue breaker are being prepared and it is expected that work will be started on the structure within two months.

Pottsville—The Holmes workings of the Wadesville colliery, one of the most important operations of the Philadelphia & Reading Coal & Iron Co. developed a fire recently. Officials of the company said that the fire would shortly be under control. Foreman J. C. Culver, Harry Childs and William Davis, of St. Clair, and John Barry, of East Mines, were overcome by smoke. Gaseous conditions made effective fighting of the fire difficult.

Bituminous

Starford—J. Mack Stewart, of Clymer, Pa., has sold his one-half interest in the Harve-Mack Coal Co., whose mines are located here, to his partner Harvey Hetrick, for a consideration of $40,000. The mines have been in operation about two years and have a daily capacity of about 250 tons. Mr. Hetrick is now sole owner of the mines.

Perryopolis—The Jamison Coal & Coke Co. is rushing work on its new No. 2 mine here, which is located on the Alfred Fuller tract composed of 522 acres. The company has erected 22 houses and 45 more are in the course of construction. The plant will be one of the most modern and largest in this region.

Washington—Dr. J. B. McMurray, of this place, has just sold the coal underlying his farm of 105 acres in Independence Township, Washington County, to L. M. Irwin, of Avella, for $21,000, or $200 per acre. Mr. Irwin has also purchased the coal underlying the farm of James Boles, in Independence township, at $150 per acre; the tract contains 100 acres.

Waynesburg—Among the coal land deals consumated recently is the sale of a tract of 104 acres from the Green Improvement Co. to the Cumberland Coal Co. for a consideration of $62,464.60. This tract is located in Cumberland Township, Green County, Pa. Another deal was the transfer from Elizabeth J. Brown to the Cumberland Coal Co., of 83 acres in Cumberland Township for a consideration of $113,833.75.

Altoona—The board of directors of the Central Pennsylvania Coal Products As-

sociation (headquarters at Altoona) adopted resolutions expressing the pleasure of the board over the appointment of a Central Pennsylvania operator, Rembrandt Peale, as a member of the commission and pledging their support to him in the discharge of his duties. The meeting was presided over by Chairman T. H. Watkins, of New York, president of the Pennsylvania Coal & Coke Co. Harry Boulton, of Clearfield, president, and M. J. Bracken, vice president, of the Central Pennsylvania Coal Producers' Association, also attended. The board of directors also discussed the car shortage, it being asserted that 12,000 cars had been diverted to the West during the strike and that none had been returned as yet. In most cases the coal was unloaded.

Uniontown—Officers and directors of the Washington Coal & Coke Co., were reelected at the annual meeting of the stockholders held recently at Dawson, Pa., M. M. Cochran, president; W. Harry Brown, of Pittsburgh, vice president; J. H. Price, Dawson, secretary-treasurer; and M. E. Strawn, Dawson, assistant secretary-treasurer.

Philadelphia bankers and investors have incorporated a $1,250,000 company—The Pennsylvania & West Virginia Coal Corporation—to develop 661 acres of coal land near Gilmer, in Gilmer County, W. Va., and in Somerset County, Pa. They have taken over the Gilmer-Pittsburgh Coal Co. J. H. B. Egan is president; Francis O'Kane, vice president and secretary; J. Edward Thompson, treasurer, all of Philadelphia. Biddle & Co., Philadelphia bankers, are among those interested.

Brownsville—The sale of the Orient Coke Co. in Pittsburgh is understood to be the initial move in the organization of another large fuel subsidiary by powerful steel interests. The property was sold to Frank E. Peabody and his associate, E. S. Reilly, in the Reilly-Peabody Fuel Co. Title to the property will be taken in the name of the American Coke Corporation. The sale of the Orient company removes another prominent coke concern from the merchant class and further intrenches furnace interests in the Connellsville coke trade. On the directorate of the American Coke Corporation, now being organized, as the holding company of the fuel subsidiary, will be Eugene S. Reilly, Frank E. Peabody and W. Russell Carr. The same men are also stockholders and directors of the American Connellsville Coal & Coke Co. which a few years ago purchased the old Sunshine properties, and now own about 900 ovens in Fayette County. Other directors of the corporation will be announced, it is understood, when the organization has been completed and other deals now pending are consummated. R. M. Fry, who has been general manager of the company since the death of O. W. Kennedy, will be retained in the same position by the new owners of the Orient Coke Co.

Seriousness of the coal situation through shortage of cars is indicated in a statement issued recently by Richard W. Gardiner, commissioner for Pittsburgh Coal Producers' Association. The statement, in part, follows:

"Production of coal in the Pittsburgh district has not approached as near normal, since the strike ended, as was hoped.

"During October the mines in the Pittsburgh district, with an actual capacity of 4,000,000 tons, ran about 90 per cent of production, being about 3,500,000 tons. All of these mines were down during November.

"About the middle of December the men began to come back to work, and the actual tonnage lost by the strike during December was 1,688,000 tons. After the mines started up there was a further loss of 648,700 tons, due to the fact that not all of the men on the payroll in October reported for duty.

"Notwithstanding these losses, the mines still were able to produce 200,000 tons more than the railroads could transport in the last two weeks of December, and this loss of 200,000 tons production was due to car shortage alone. The figures are taken from 136 mines and are representative of conditions existing all through the Pittsburgh district."

WEST VIRGINIA

Charleston—An important meeting of the Smokeless Coal Operators' Association of West Virginia—the first since the regular annual meeting—was held at the Bellevue-Stratford Hotel, in Philadelphia, Pa., Jan. 15, when conditions in general affecting the smokeless region formed the general subject of discussion. Of paramount importance is the car supply which has so seriously affected the production of smokeless coal in recent weeks, and to that subject the association gave its major attention. Members of the association say they cannot understand why export shipments of smokeless should be so seriously curtailed when so many vessels are available. Producers of smokeless coal point out that all facilities for the production of smokeless are available except means of transportation.

Fairmont—An agreement has been reached, subject to confirmation by Judge Thompson, in the Federal Court under the terms of which exceptions to the report of the referee in bankruptcy in the case of Josiah V. Thompson, of Uniontown, filed by West Virginia judgment-lein creditors, are not to be pushed, conditioned upon a settlement being made in full in favor of the judgment-lein creditors. This has been agreed to by the committee representing Pennsylvania creditors. Originally it had been decided to pay to West Virginia creditors, out of the sum of $5,000,000 realized from the sale of the Thompson properties to the Piedmont Coal Co., only $1,000,000 in settlement of West Virginia claims. That fell short $500,000 of satisfying judgment-lien creditors whose judgments of course gave them prior liens. Not only will West Virginia creditors be paid in full but will receive interest on their claims at the rate of 4½ per cent. The Piedmont company has been granted until March 1 to make payments, that time being necessary in order to complete the examination of titles.

Mt. Hope—Impetus was given to the movement for the improvement of the mines of Fayette County, W. Va., and for better conditions within the mines by the organization at this place, on Jan. 5, of the Fayette County Mining Institute. The new institute includes mine managers, superintendents, mine foremen, fire bosses and a number of others interested in learning more about mining, there being fully 70 present at the organization meeting. The State Department of Mines was represented by W. J. Heatherman, chief of the department, and by deputy inspectors, who have been lending encouragement to the organization of mining institutes in various counties of the state, in accordance with the suggestion of the West Virginia Mining Institute. The meeting at Mt. Hope was called to order by P. M. Snyder, head of the Pemberton Fuel Co. and other companies, Mr. Snyder presiding pending the election of a temporary organization. Temporary officers elected were: Robert M. Lambie, a district mine inspector, temporary chairman; Geo. W. Bright, temporary secretary. A committee, consisting of Tom Donelson, Sun, W. Va.; Joe McCauley, of Harvey, W. Va.; John Whitehead, Star, W. Va.; John Malabone, Summerlee; T. H. Snyder, Mt. Hope, was appointed to submit a report at the next meeting of the institute, which will be held on the evening of the second Saturday in February, as to a constitution and by-laws and also to submit nominations for permanent officers.

Gary—In keeping with its annual custom, the United States Coal & Coke Co. held here on the night of Jan. 10, its tenth annual safety-first banquet, General Edward O'Toole, general manager of the company, acting as toastmaster and introducing several prominent speakers. Covers were laid for about 300, including executive officials, mine foremen, other employees, exemployees and their guests. Discussion revolved around the accomplishments of the past year in safety and welfare work and plans for even greater work in the future.

MARYLAND

Cumberland—In its report submitted to the court, the Grand Jury (January term) of Allegheny County urges that a bill be prepared for presentation to the General Assembly providing for an assistant to the mine inspector. The report says, in part: "We believe that it is a physical impossibility for the mine inspector personally to visit every mine in Allegany and Garrett counties once every 60 days, as required by law, there being in both counties 135 or more mines in actual operation." It is also pointed out that according to the law and in order that the inspector perform his duties properly, a certain amount of time, in some cases from two to three days, must be spent at some of the mines, and therefore advocates the appointment of an assistant mine inspector.

ALABAMA

Birmingham—The Alabama convict board has renewed contracts for the hire of convicts to the Sloss-Sheffield Steel & Iron Co., Pratt Consolidated Coal Co., Bessemer Coal, Iron & Land Co. and the Montevalle Mining Co., for the term of two years ending Dec. 31, 1922. A new provision in the contracts stipulates an 8-hour day for convict labor, after which time the laborer may elect to stop work, or remain at work for a longer period, receiving compensation for all time made over the eight hours.

Official figures show that 115,961 tons of coal was moved via the Warrior River to the ports of Mobile and New Orleans during 1919. Transportation facilities which will soon be available in the way of additional barges and tow boats provided by the Federal Government will insure a heavy increase in this movement in 1920.

OHIO

Columbus—Secretary B. F. Nigh, of the Michigan-Ohio-Indiana Coal Association, has been overwhelmed with inquiries on the part of dealers concerning the report that the award of the president's wage commission is likely to be retroactive. Some shippers have been sending out the statement that in case the wage award is retroactive, they will collect the excess from the dealers. This has caused many dealers to go slow in buying. Secretary Nigh announces that there is no possibility for the wage award to be retroactive.

ILLINOIS

Christopher—Recently the main shaft hoist of the Valier Coal Co., at Valier, three miles south of here, made one of the largest hoists on record, as far as known. In one hour and 12 min. this company hoisted 1,258 tons of coal; this is at the rate of 1,048⅓ tons an hour, or 8,387 tons in a day of eight hours. The company states that no special preparations were made for this performance; some coal had accumulated at night and in the morning continuous hoisting was maintained for the time stated without having to wait for coal. An interesting description of the hoisting proposition at Valier is given in an article entitled. "Engineering Features of Modern Large Coal Mines in Illinois and Indiana," in the Nov. 27-Dec. 4, 1919, issue of *Coal Age*.

ARKANSAS

Fort Smith—Sustaining charges that Thomas H. Shaw, State Mine Inspector, had not worked for the public interest, the State Mine Examining Board has revoked his interest and has issued a license to A. W. Tomlin, who has been appointed to succeed Shaw by Governor Charles Brough.

Fort Smith—The Central Coal & Coke Co. has all of its Arkansas mines in operation again, following the closing of the mines by Thomas H. Shaw, who was recently removed as a state mine inspector. The Central company claims that Shaw had no right to close the mines and that he has lost $160,000 in wages to Arkansas miners.

KANSAS

Pittsburg—The headquarters of the state's receivers for the coal mining properties have been removed from Pittsburg to Topeka. The receivers, C. D. Sample, of Fort Scott and B. S. Gaitskill, of Girard, announced they desired to have their records easily accesible for the state legislature.

Obituary

John P. McCabe, veteran coke expert of Scottdale, Pa., and for 22 years coke yard superintendent of the Davidson plant of the H. C. Frick Coke Co., died at the home of his daughter, Mrs. Lawrence Eberhardt, Scottdale, Pa. Mr. McCabe was employed at the Davidson works since 1871 until his retirement from active service a few years ago. He was aged 75 years.

William Preston Yeatman, a well-known coal operator of the Birmingham district, Alabama, died suddenly Jan. 7 from an attack of acute indigestion. Mr. Yeatman was an executive officer of the Aetna Coal Co., with mines near Searles, Tuscaloosa County and was stricken while on an inspection trip at his operations; he died shortly after reaching his home in Birmingham. He had been interested in the development of various coal properties in this field for the past 15 years and was about 42 years of age at the time of his death. He is survived by his widow and two brothers, John T. and George M. Yeatman.

Personals

L. Epperly, Wytheville, Va., an old time employee of Justus Collins' interests, will succeed Mr. Wolf as manager.

George Wolf has resigned as manager and treasurer of the Winding Gulf Colliery Co., Winding Gulf, W. Va., and the Superior Pocahontas Coal Co., Davy, W. Va.

O. L. Walters, chief clerk of the H. C. Frick Coke Co., at the Bridgeport mines, has been made superintendent of the Filbert mines of this company.

O. H. Millward has been promoted from superintendent of the Filbert mines of the H. C. Frick Coke Co. to assistant mine inspector of all the mines of the Frick company.

William Keck resigned as superintendent of the No. 2 mine of the Jamison Coal & Coke Co., at Perryopolis, Pa., to assume charge of all the mines of the Pittsburgh Steel Co. The plants are located near Monessen and Brownsville, Pa.

Richard Peters, Jr., formerly with W. J. Rainey and president of the Connellsville Coal Tariff Association, has resigned his position with Rodgers, Brown & Co., of Philadelphia, Pa., to become associated with Robert C. Lea & Co., of Philadelphia.

David Millward has resigned as superintendent of the Tower Hill mines of the Tower Hill Coal & Coke Co., at Tower Hill, Fayette County, Pa., to become superintendent of the new No. 2 mine of the Jamison Coal & Coke Co., at Perryopolis, Pa.

W. Roper, formerly with the Canadian Western Fuel Co., Ltd., has been appointed mine manager for the Pacific Coast Coal Co., South Wellington, Vancouver Island. This position has been held by Robert Bonner for some time.

J. T. Morris, late of the Pemberton Coal & Coke Co., of Affinity, W. Va., has given up his position as superintendent of the mines in question and has taken over a 2,000-acre lease west of Herndon, organizing the Morris Coal Co. Preparations for immediate development are being made and Mr. Morris says he will be shipping coal in sixty days.

Clyde Caldwell has accepted a position as purchasing agent for the Curry-Campbell Coal Co., of Philadelphia, and will purchase coal throughout central Pennsylvania for this jobbing concern. Mr. Caldwell served as a lieutenant in France and was severely wounded twice. He has just been discharged from the military hospital. His headquarters will be in Indiana, Penn.

George R. Collins will be treasurer of the two companies, besides taking a more active interest in operations as vice president. Mr. Collins' headquarters will be at Charleston and Mr. Epperly's at Winding Gulf. Mr. Wolf is organizing a bank at Davy; he is the president of the Atlantic Smokeless Coal Co. at that place, and the Very Top Seam Coal Co., at Beckley, where he will make his headquarters.

Charles M. Means, of Pittsburgh, Pa., has been retained as electrical expert by Chief of Mines S. E. Button for inquiry into the subject of locomotives in coal mines, according to a recent report from Harrisburg, Pa. Mr. Means will continue investigations already under way. He will attend a conference (called by Mr. Button) in Harrisburg on Jan. 27, at which mine operators, inspectors, employees, safety men and manufacturers will discuss the subject.

Industrial News

Kingwood, W. Va.—Ohio investors will organize a $300,000 company to develop coal mining properties in the district of Preston County. They have incorporated the Deaker Mining Co. The incorporators are, Geo. M. Anderson, J. A. Hagstrom and A. T. Carnahan, all of Akron, Ohio.

Chicago, Ill.—The Columbia-Panama Coal Co., 840 State-Lake Building, has perfected arrangements for the development of about 1,200 acres of coal properties in the vicinity of Manchester, Ky. It is understood that the company's plans include the construction of a new electric power plant. Charles R. Garrard is general manager.

Fairmont, W. Va.—Although the Pittsburgh & West Virginia Coal Co. will have its operation in Monongahela County, on the Morgantown & Wheeling R.R., the headquarters of the company will be in Fairmont, where offices have been secured and opened in the American Building. This is a new company which contemplates development work on a large scale.

Wellsburg, W. Va.—The Follansbee Gas Coal Co. has been organized with a capital of $150,000. The company plans to operate not far from Follansbee, W. Va., but Wellsburg, for a time at least, will be the headquarters of the new corporation. Behind the new company are: G. S. Irish and J. J. Walker, of Follansbee; J. S. Liggett and E. E. Carter, of Wellsburg; J. J. Arnold, of Washington, Pa.

Wolf Summit, W. Va.—The Wolf Summit Coal Co. has had plans prepared for the development of a total of about 2,200 acres of coal properties in the Wolf Summit district, to have a capacity of about 2,500 tons daily. Electric-operated equipment will be utilized wherever possible. The company has recently filed notice of an increase in its capital from $350,000 to $750,000 for proposed expansion. T. R. Craig, Clarksburg, W. Va., is manager.

Sutton, W. Va.—Operations will be conducted on an extensive scale in Braxton and Webster counties of West Virginia, by the American Fuel Co., just organized, mostly by Phliadelphia people. The capital of $1,500,000 discloses the extent of the company's development plans. Principal figures in the organization of the company were: H. C. Johnson, John E. Bassett, Randall F. Collins, H. S. Glazier, all of Philadelphia; William P. Cubberlye, of Trenton, N. J.

Beckley, W. Va.—C. H. Mead, of the Mead-Tolliver Coal Co., and Ingram Branch Coal Co., has lately consolidated the Meade-Tolliver Co., with the holdings of the Cadle Land Co. and acquired possession of the East Gulf Coal Co., on Stone Coal Creek. These three companies will be united in what will be known as the C. H. Mead Coal Co. The three companies combined have a large acreage and Mr. Mead intends to build up the output to 500,000 tons a year.

Morgantown, W. Va.—The Vienna Coal Co. will conduct mining operations in Monongalia County, the preliminary organization of the company in question having just been effected by Morgantown business men as follows: Lee R. Shriver, P. P. Weaver, R. P. Posten, R. H. Jarvis and M. J. Malamphy. The company has a capitalization of $100,000. It is understood that preliminary development work will be begun in the near future.

Welch, W. Va.—Construction work is being pushed on the new tipple of the Sagamore Colliery Co., at McComas, W. Va. The tipple is to be of reinforced concrete and will be one of the largest structures of its kind in the Pocahontas field. The tipple now under construction is to replace one destroyed by fire several months ago, since which time the company has made no effort to operate. Work will hardly be completed on the new tipple until late in the spring.

Kingwood, W. Va.—Development of Preston County coal lands will be undertaken in the near future by the Beek Mining Co., which represents in large part an investment of Akron, Ohio, capitalists. Headquarters of the company will be at Kingwood. The plant to be constructed will cost in the neighborhood of $300,000. Among those active in the preliminary organization of the company were George M. Anderson, A. T. Carnahan, F. G. Carnahan, J. A. Haystrom and M. E. Schief, all of Akron, Ohio.

Logan, W. Va.—Announcement was made a short time ago that the Lincoln Smokeless Coal Co., a new $600,000 company in which the Hutchinsons of Fairmont are largely interested, would begin the shipment of coal from its mines near Rainelle on Jan. 10. It is also planned so far as can be learned to enlarge operations during the year with a view to the fuller development of the company's 3,000-acre tract. The new plant is on the Sewell Valley branch of the Chesapeake & Ohio R. R.

Northfork, W. Va.—The same people are behind both the Harlan-Cumberland Coal Land Co. and the Harlan-Cumberland Coal Mining Co. These companies were just organized largely by West Virginia business men, the capital of the mining company being $150,000 and of the land company $200,000. The land held is in Harlan County, Ky., where development work will be undertaken. Active in the formation of both companies as incorporators were: Harry Totz, of Northfork, W. Va.; Abe Foman, of Kimball, W. Va.; M. O. Litz, J. N. Harman and B. H. Gray, of Welch, W. Va.

Elkins, W. Va.—It is learned that the Brewer-Harrison Coal Co., organized a few weeks ago, will begin work on a new plant in the Collins district of Lewis County, W. Va., in April 1920. The company plans to produce about 150,000 tons a year. The company will purchase tipple and house material, mine cars, rails and mining machinery. Preliminary development work will be in charge of W. W. Brewer, of Belington, president and general manager of the new company.

Chicago, Ill. — The Chicago Pneumatic Tool Co. announces the appointment of E. A. Woodworth and C. E. Laverenz as special railroad representatives attached to the staff of Manager of Western Railroad Sales, with headquarters at the Fisher Building, Chicago.

Mr. Woodworth has been for several years secretary of the Committee on Standards, U. S. Railroad Administration, at Washington, D. C., following varied service with different railroads. Mr. Laverenz has also had Government and railroad connections, gaining experience of value to him in his present service.

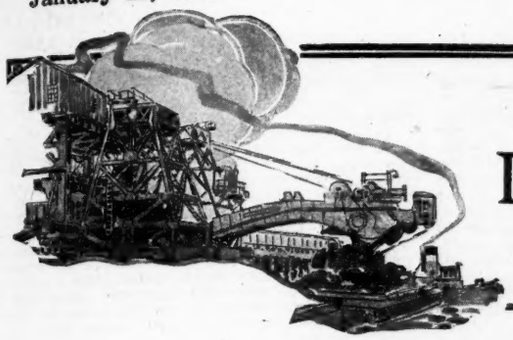
Beckley, W. Va.—The plans of the Crab Orchard Coal Co., organized since the first of the year, disclose the fact that this company will start work on its plant in connection with the drift mine it proposes to open, about April 1, completing the operation early in 1921. About $350,000 will be expended on the new plant. The company expects eventually to be able to produce about 125,000 tons a year. As a part of the equipment the company will install mining machines, motors, mine cars, rotary converters, and a power sub-station. Prince E. Lilly will be in charge of operations.

New York, N. Y.—A contract recently signed between the Fairbanks Co. and the Lincoln Electric Co., of Cleveland, Ohio, gives the former company the exclusive distribution of Lincoln electric motors for industrial applications. This line includes alternating-current motors for 2-phase and 3-phase circuits in capacities from one-half to 500 hp., for all commercial voltages and frequencies, and direct current motors from one-half to 150 horse-power. The Fairbanks Co. will also co-operate with the various Lincoln district offices in connection with the sale of the manufacturer's other products.

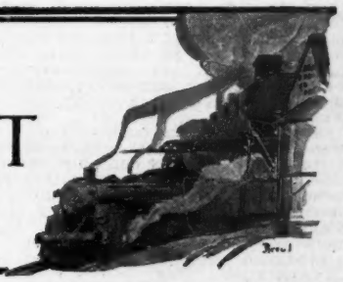
New Castle, Pa.—Local business men here perfected the organization of the Ellwood Coal Co., which is capitalized at $100,000. The officers of the corporation are: President, S. A. Barnes; vice president, L. S. McNab; secretary, M. S. Woods; treasurer, Samuel Douthett; counsel, Clyde Gibson. A charter has been obtained and the company has acquired 300 acres of coal lands in Beaver County, Pa., estimated by engineers to contain 2,000,000 tons of coal. The tract is located between Ellwood City and New Brighton and was formerly the Anderson farm. The coal is to be mined for domestic use, although there is said to be a seam which will later be opened for industrial purposes.

Williamson, W. Va.—A deal equaling in magnitude the purchase of the properties of the Red Jacket Consolidated Coal Co. by M. A. Hanna & Co. is that which it now appears certain is being consummated for the purchase of the extensive holdings, mines, plants, etc. of the Pond Creek Coal Co. by the Solvay company, for the sum approximately of $5,000,000, it is understood. Color is lent to the belief that such a deal is pending because of the fact that a complete inventory is being made of the Pond Creek plants. The annual production of the Pond Creek Coal Co. is approximately 1,000,000 tons a year, produced at 11 different plants. The company has been successfully operating mines for the last nine years or since 1911. A heavy tonnage of Pond Creek coal has been sold to the Solvay company, the product of the Pond Creek mines being suitable for byproduct ovens.

Philadelphia, Pa.—The Combustion Engineering Corporation of New York has enlarged its facilities for handling business in the Philadelphia territory. The office of the company in this territory is located in the Lincoln Building and W. C. Stripe, formerly of the Pittsburgh office and formerly of the Westinghouse company, becomes manager of the Philadelphia district. Associated with Mr. Stripe in that territory on the active selling force are C. L. Bachman, formerly manager of the Chicago office of the Combustion corporation before the war, and E. F. Kuehnle, formerly of the main office in New York. Among the types of stoker manufactured by the Combustion Engineering Corporation are the Type E underfeed stokers, designed for use with bituminous coal where heavy loads are required; the Type K stoker, designed for use with bituminous coal where moderate loads are required on small boilers, and the Coxe stoker which is designed for burning any kind of low-grade, high-ash fuel. This corporation also manufactures the Grieve grate which is designed for any plant (burning either bituminous or anthracite coal) that for any reason may not install automatic stokers.



MARKET DEPARTMENT



Weekly Review

Most Markets Are Fairly Well Supplied and Little Actual Suffering Is Felt. Production Is at a Low Point and Still Decreasing. All Over the Country Except in the South the Car Supply Is Inadequate.

FROM all sections of the country, except the Birmingham district, come reports of a car supply entirely inadequate to production needs. In this Southern district the output is reported as being nearly normal and approaching wartime records, yet even here the car supply is not wholly equal to demands. Throughout the balance of the country the car shortage is severe, and the output in many localities ranges somewhere between 30 and 50 per cent. Such short transportation facilities can have but one result. It is utterly useless to develop natural or manufacturing resources if, after the development, the product cannot be distributed.

Prices with one or two exceptions are unchanged from last week. Practically all coal is quoted at Government price, but little is sold at that figure as most of it moves on contract or to export. Cold weather and snowstorms in many parts of the country have increased the demand for fuel while rendering transportation problems somewhat more difficult. Stocks previously accumulated must therefore be drawn upon, and accordingly these are being gradually depleted.

In some places a scarcity of fuel exists which borders upon the critical. Thus in New York because of failures in delivery of both coal and fuel oil some industrial establishments are facing the necessity of closing down. Thus one of the largest markets in the world, lying within a few hundred miles of the source of supply, is in trouble solely because of a lack of suitable and adequate transportation.

The coke industry, both beehive and byproduct, is slowly increasing its output. This is, however, by no means up to the demand, and much more coke would be absorbed provided it could be made. Here again the car supply is the limiting factor. There is no question but that the byproduct ovens would greatly increase their output if only cars were available.

The whole adverse situation may be summed up in the words: The transportation lines during past years have been strangled, discouraged, regulated, repressed and finally "controlled." They must not only soon be amancipated but encouraged, if serious national disaster is to be avoided.

WEEKLY PRODUCTION

The high rate of production reached during New Year's week declined somewhat during the week ended Jan. 10. The daily rate is estimated at 1,905,000 net tons, compared with 2,060,000 tons on the five full working days of the week before. The total output for the week of the tenth, including lignite and coal made into coke, is placed at 11,432,000 net tons. This was an increase over the corresponding week last year of 1,071,000 tons, or 10.3 per cent. Indeed the week's performance was exceeded but five times during the entire year 1919. The total production to date of the coal year which began last April (1919-1920) amounts to 367,470,000 tons. Compared with the 460,890,000 tons of the preceding coal year (April 1, 1918, to March 31, 1919), this is a decrease of 93,420,000 tons.

According to the reports of the nine anthracite carriers, shipments were higher for the week of Jan. 10 than at any time since Dec. 13, amounting to 34,971 cars. On this basis the total production for the week, allowing for mine fuel and sales to local trade, would be approximately 1,796,000 net tons. Compared with the 5-day week of New Year's, this was an increase of 311,000 tons; compared with the corresponding week, last year, the increase was 145,000 tons, or 9 per cent. The current output of anthracite thus continues well above that of a year ago. The cumulative production the beginning of the coal year, however, shows a decrease of approximately 6,230,000 tons.

The beehive coke market continued active during the week ended Jan. 10. The total production for the country is estimated on the basis of rail shipments at 422,000 net tons, an increase over New Year's week of 24,000 tons, or 6 per cent. The output has been exceeded but six times since March 15, 1919. Compared with the corresponding week of last year, however, when the influence of the war demand was still felt, production showed a 22 per cent decrease.

The ninth week witnessed a general improvement in both car supply and attendance at the mines. Strike losses decreased 0.2 per cent.

Atlantic Seaboard

BOSTON

Market gradually tightening. All rail receipts slope off. Rumor that export coal will be excluded from New York and Philadelphia piers. Only scattered inquiry for spot coal. Short supplies at Hampton Roads. New England railroads reported uneasy over fare situation. Domestic sizes still in strong demand. Cold weather a factor.

Bituminous.—While there is general agreement among the trade that stocks are ample and that there will be no real ground for uneasiness if deliveries all-rail are maintained on their present basis, yet it is clear that buying grows more difficulty from week to week. The few orders that are in the market for anything like comprehensive tonnage are harder to place than a fortnight ago.

The fixed price, with no authority to add the wage increase, makes hot prices entirely unattractive to the great number of operators who are able to get on very nicely, car supply and labor situation considered, with the orders and contracts accepted prior to Oct. 30. There is much interest here in current reports from the Wage Commission, for it is realized that present regulations are operating against a fair share of output for New England.

For the first 14 days of January receipts all-rail through the far gateways averaged 312 cars daily of bituminous for commercial consigners, a considerable decline from average receipts the latter half of December. The fact is that this is the trend of both water and rail, and should the weather hold cold the next fortnight there will doubtless begin to be some anxiety, at least among a large number of small buyers. Retail dealers, as a whole, have very small stocks on hand and for that reason various lesser manufacturers have less tonnage on which to rely than would normally be the case.

It has been rumored the past few days that the Railroad Administration would shortly put on the clamps again, so far as over-seas coal is concerned, over the Philadelphia and New York piers. There has been complaint over the volume of coal removed from line and city water by the extra price for export, and apparently the authorities are disposed to confine the issue of permits for foreign cargoes to coal mooring via Hampton Roads. If such action were taken it would certainly improve materially the prospect for prompt coal at the New York loading piers.

There is no approach, however, to a broad market. Inquiries are still scattering with the accent slightly on deliveries all-rail. Some buyers who are in the market have despaired of arranging deliveries by water. Freights, particularly from Hampton Roads, are so high and heavy demurrage is so likely to accrue that there is every inclination to look for relief all-rail, if at all possible.

For that reason, more or less coal that would not be considered in ordinary times is being sold at the Government price and is coming forward for the sake of assuring certain of the anxious steam-raisers a continuing supply.

At Hampton Roads there is a general shortage of coal at all three piers for all shippers. The number of cars in the railroad yards is less than a third of normal. Permits have been granted for enough foreign cargo steamers to affect seriously the tonnage available for coastwise deliveries. There are 25 or 30 additional foreign cargo steamers waiting, for which permits have been asked, and from this it can be gathered how difficult it will probably be to arrange for shipments of smokeless coals on any but old purchases. On the 9th inst. there were but 140,000 tons on hand for all requirements. Should export loadings now be confined to Hampton Roads, and possibly Baltimore, this situation would hardly improve, at least from the standpoint of agencies interested in New England business.

Anthracite.—Notwithstanding the signs of easiness that were general a fortnight ago, shipments have again fallen off and

there is very nearly as much pressure as heretofore to get domestic sizes, especially stove and chestnut. Egg and pea are still druggy so far as demand is concerned, although there are refill orders already being placed by consumers, and this will mean a better market for egg size in February.

There is still a feeling that it will be wise for the smaller retailers especially to take on what they can store conveniently. So many things can happen that the more prudent will be sure to line up for shipments during the balance of January and all of February. At this writing, low temperatures are distinctly a factor. Ice has embargoed some of the smaller ports on Massachusetts Bay.

NEW YORK

New York tidewater market adjusts itself to weather conditions. Cold weather increases demand. Easier situation felt by producers and shippers of individual coals. Dealers look for steady demand until April 1 when working agreement with mine workers ends. Bituminous stocks small. "Free" coals scarce because of contract demands. Ice in rivers and bay interrupts shipments.

Anthracite—This market has again showed its adaptability to weather conditions. So long as the conditions remained moderate domestic coals were in ordinary demand but as soon as the temperatures became nearer the zero mark there was a flurry and dealers could not make the deliveries required.

Supplies at the local docks do not show any appreciable increase over last week, but there was an increase in the number of cars dumped. The demand for chestnut and stove coals continues to be as active as it has been for the past few months with an almost equal call for egg.

There were 6,459 cars of anthracite dumped at the local railroad piers during the week ended Jan. 16 as compared with 5,190 cars in the week ended Jan. 9, an increase of 1,269 cars.

Current quotations for company coals per gross tons at the mines and f.o.b. Tidewater at the lower ports are as follows:

	Mine	Tidewater
Broken	$5.95	$7.80
Egg	6.35	8.20
Stove	6.60	8.45
Chestnut	6.70	8.55
Pea	5.30	7.05
Buck	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00
Boiler	2.50	4.25

Quotations for domestic coals at the upper ports are generally 5c. higher on account of the difference in freight rates.

Bituminous—The lack of coal at the piers continues to be serious, with no immediate prospect of improvement. Demand is on the increase, but shippers can do little to ease the situation. Much of the present condition is attributed to the lack of cars and the resultant short deliveries. The local market is active in demand, but there is no coal to meet it. Contract coal is moving, with the result that there is little free coal available for the spot buyer.

Notices have been received here from the Regional Coal Committee that on account of the increased demand for coal by industries it has been found necessary to withhold for the present further approval of requisitions for the exportation of coal to other countries and that it will not approve requisitions for export coal until the domestic situation becomes easier.

PHILADELPHIA

Anthracite demand strong due to wintry weather. Consumers after more coal. Fair shipment by operators. Stove and nut the favorites. Egg picking up. Pea in fair call. Companies moving pea actively, but independents find it heavy. Retail prices not so firm. Good business in sight for many weeks. Buckwheat in strong demand. Other steam sizes flat. Bituminous in good demand, but only fair receipts. No spot market. Embargo at tide. Car shortage holds back trade. Fair coke demand.

Anthracite.—With wintry conditions still prevailing there is a strong demand for coal and the retailers daily urge the shippers to give them increased allotments. The strongest demand is as yet centered about stove and nut, although there is a strong call for egg. One of the larger shippers whom we have consulted said that their trade has actually picked up very considerably on egg, until at this time they are somewhat behind orders on this size. It is noticeable also that the piles of this size in the retail yards are not as heavy as they have been.

It has also been pea-coal weather and a large percentage of the rush orders lately have been for this size, and every dealer, without exception, has been busy putting out pea. A large proportion of the deliveries made by all companies has been of this size, but it is the one coal that the dealers do not welcome, simply because it is not moving out at the rate they had expected. Some dealers have even gone so far as to order further shipments of this size held, at the risk of having their shipments of other sizes curtailed. However, we learn from some of the larger shippers that recently they have not had much difficulty in moving pea, and one shipper was actually picking up coal from storage to meet their orders.

It is an odd thing, but lately there has been discovered a tendency on the part of some dealers to be less firm in prices than has been their wont. As a standard, $11.25, $11.90, $11.90 and $9.50 respectively for egg, stove, nut and pea have been generally acknowledged, yet we have heard of some instances where stove and nut, the hard sizes to get, have actually been shaded 15c., and when the competition became a little strong a further cut of 15c. has been allowed.

This has happened in only one section of the city and under the present conditions of trouble in procuring an adequate supply of coal is hard to understand. It is believed that most all dealers, with the exception of the larger ones, are shading the price of pea coal when the customer is inclined to insist upon a reduction. With the severer weather conditions which have just set in it is possible that this one bad spot will eliminate itself very quickly.

The steam sizes continue to be in an odd position. The big companies report that so far as buckwheat is concerned they are at times unable to produce sufficient of this size to fill current orders. This is particularly true when the temperature falls to zero and below in the region, necessitating the suspension of their big washery operations. Most of the companies have cleaned up their storage yards on this size and as the demand for buckwheat usually grows stronger from this time onward it is quite likely that consumers will take a proportion of rice. There is little call for rice and barley and some shippers say their trade on these sizes is distinctly flat, although with the tendency of buckwheat to grow shorter, activity can be expected in these sizes before very long.

Bituminous.—There have only been fair receipts of fuel in the city during the past week, and the demand for coal has grown distinctly stronger. There is still no spot market worth mentioning and even such coal as is offered is not the kind to be quickly taken. Yet in spite of this even spot sales are taken subject to delay, as the car supply recently has been hovering around 30 per cent for all regions.

The embargo at tide has had the tendency to release a fair tonnage of coal for the local market, but even this has been mostly applied on contract trade, which class of customers is calling for good shipments, as the feeling is growing among them that with no heavy snow storms to impede delivery thus far this winter, the chances are that this handicap may develop later and they do not want to be caught short.

Ordinarily at the first of the year there has been some little contract business. Of course under existing conditions no shipper has gone out after new connections, but all of them have customers of this kind of long standing and agreements have been closed with this class of consumer at prices around $3.20, and of course with the understanding that any award of the investigation committee will be retroactive.

Coke.—There is a fair demand for foundry and furnace coke at the Government prices of $8.25 for the former and $7.25 for the latter, per net ton.

BALTIMORE

Big improvement in car movement noted with better deliveries of empties to mining regions. Recrudescence of export trade and deliveries on higher priced contracts taking largest tonnage, and little or no government-priced coal is offered. Hard coal prices not likely to advance despite rumors.

Bituminous:—A big improvement in the car movement is noted on this division. From a record for many days that seldom went above 2,000 cars per day, and frequently dropped as low as 1,600 to 1,800 cars, the last few days has seen the 3,000 car daily mark generally exceeded and loadings on particular days as high as 3,600 cars. This increased movement is reflected in the constantly bettered conditions of ship loading here on export and the larger deliveries on some contract relations in this section.

True, the movement has not caught up with the big gap made in the government clean-out of the local pool, and no attempt at general replacement of this feature has been made. Mine owners and shippers generally are devoting their energies on the increasing trade to the export selling line which allows $1.35 above the government prices, and which is generally split between producer and intermediate handler, and to deliveries on the higher-priced contracts. For the time being there is little or no government-priced coal in this market.

The export movement dragged for the first six days of the month, entirely due to the fact that, while vessels in large numbers were here ready to take the coal, the fuel was slow in starting on its run from mines to tide by reason of the government restrictions for supervision of permits to export, and which had to pass through Philadelphia, Washington, and then Baltimore again. Between the sixth and the fifteenth of the month a total loading a little in excess of 60,000 tons of cargo coal on export was noted.

Anthracite:—The hard-coal situation has suffered no material change. A little awakening of demand in mid-winter call has followed the recent snow and colder weather. The fact that the price of soft coal was raised 25c. per ton in Cumberland, and this was announced as a "domestic jump" led to a rumor here that prices were to be advanced in this city. The trade here in anthracite intends to proceed for the balance of the winter with the present schedule, unless some unexpected turn is taken to increase their overhead cost of wholesale purchasing price.

Lake Markets

PITTSBURGH

Car shortage continues. Slight increase in coal supplies to by-product ovens. Some consumers have probably overbought.

Car supplies in the Pittsburgh district have not increased appreciably in the past week and are still very unsatisfactory from the viewpoint of both operators and consumers. Coal production is about 75 per cent of capacity and is unequal to the demand, viewed from the angle that there is much seeking to buy coal on the part of consumers who ought to be well supplied from their regular sources, but on the other hand there is little evidence of manufacturing consumers, including the steel industry, curtailing their operations on account of not having sufficient coal.

An exception to this generalization is the byproduct coking industry, which is by no means fully supplied. There is probably not a byproduct operation that would not run full if it had the coal, but several are unable to do so, although there has been a slight improvement in this respect in the past week.

In their efforts to secure coal a number of consumers have placed orders almost indiscriminately, buying much more than they need. When they had bought enough, provided it were delivered, and found they were not getting deliveries, they simply made additional purchases elsewhere. Perhaps they felt that the coal was a good buy, at the Government price limit, even if not delivered until later. It is quite probable that if there were a large increase in the car supply many consumers would ask producers to postpone shipments on portions of their orders.

The market continues quiet and remains quotable at Government limits: Slack, $2.10; mine-run, $2.85; screened, $2.60, per net ton at mine, Pittsburgh district, with a 15c. brokerage allowance in some instances, paid by the consumer.

BUFFALO

Bituminous trade light. Cars are scarce. Miners working fairly. Plenty of anthracite.

Bituminous.—The trade is not very active. Consumers are coming back into the market rather slowly, though it is said that one reason for this apparent inactivity is that a good many contracts and long orders are in operation. The mining end of the trade favors this, as it is in that way enabled to ignore the government prices.

On this account also shippers without direct connection with mines are finding it hard to get all the coal they want. With the car shortage and the disposition to prefer the older arrangements it is hard to meet even the moderate amount of orders that come in.

From the general appearance it would seem that the demand is improving. For a time after the strike was over it was apparent that the consumers were using more coal than they were buying and it was predicted that the supply would soon be gone and then the prices would advance, but gradually the demand improved, especially as soon as it appeared to the consumers that prices were not likely to decline. The shippers never had any idea that they would decline

Prices are still pretty unsteady. It is claimed that the regulations do not produce the uniformity that they should, on account of the special margins allowed in this or that branch of the trade. Slack is rather hard to get and sizes are not plenty.

Anthracite—The anthracite situation is still easy. Consumers are getting so much coal that they have for sometime ceased to ask for more than they want and they are now engaged in studying the coal itself, to see how far it can be made to go. There is considerable slate in it, and sometimes there is complaint of the screening, but on the whole the quality is better than it was last winter.

Perhaps never has the consumption of coal for fuel been so large during winter. With the temperature not going so low as it did two years ago the weather has been more colder and nothing is heard in the way of restriction. Some of the papers are predicting that the Upper Lake district will run short and there will be an early demand for coal again next spring, but it must be remembered that the shipment was next to the heaviest on record, so that it will take a long winter as well as a snug one to use the supply all up.

It is already predicted that next month is likely to see an end of steady early, as was the case two years ago, and then there will be a surplus. Some say that the big anthracite companies will be stocking coal by early summer, if not sooner. As to independent coal, it now sells on a par with other anthracite and does not find a very ready market at that.

Coke—The demand for coke is not strong and the contracts are pretty nearly sufficient to meet it. Jobbers find a car here or there wanted, at prices that are merely steady and are not likely to be very strong right away. The domestic demand is met by a surplus of small sizes of anthracite, so that breeze is not readily salable. Quotations remain at $9.60 for 72-hour foundry, $8.60 for 48-hour furnace, $7 for off grades and $8 for domestic sizes, with next to no market for breeze.

COLUMBUS

With embargoes and congestion still in force and car shortage growing worse, production in Ohio fields has been reduced to 50 per cent or even less. There is still a good demand for all grades, but more especially for domestic sizes.

In eastern Ohio the production is below the 50 per cent mark. Crooksville and Cambridge are producing about 40 per cent and these figures show how bad the transportation facilities are at this time. Cold weather, coupled with the wide distribution of coal cars under the Railroad Administration's regulations during the strike, are responsible for this condition. Embargoes are frequently announced by railroads which prevent the free movement of coal. Toledo is very much congested and with it many Michigan points, including Detroit, are cut off.

There is a good demand for all grades, but more especially for prepared sizes. Dealers are still buying actively, but not as rapidly as was the case several weeks ago. Householders are buying well, but many have been supplied and there is not the concern in the domestic market as formerly. Retail stocks are not large. Pocahontas is quite scarce and prices range high. West Virginia splints are coming in fair quantities. The larger part of the domestic coal in central Ohio territory comes from the Hocking Valley and Pomeroy Bend. Dealers have been handicapped in making deliveries because of the icy condition of the streets.

Steam business is also active in all sections. Large consumers are buying actively in the hopes of accumulating some reserve stocks. This is especially true of rubber plants and iron and steel concerns. Railroads are now taking a larger tonnage and some are exceeding their contract allowances.

Prices in Columbus are unchanged, as the government figures now prevail in every way. Dealers are permitted the $2 margin over and above the price paid at the mine plus the freight charges.

CLEVELAND

Anthracite pocahontas and domestic bituminous coal prices all have been advanced a flat 50c a ton. Receipts are somewhat improved over a week ago, but labor and car shortages are keeping receipts down to about half of normal.

Bituminous—All local price lists of dealers with the exception of steam coal have been increased a straight 50c a ton. Meeting a week ago with the Cuyahoga County (Cleveland) Fair Price Committee, dealers convinced the committee of the justice of their need for 50c a ton extra to cover additional labor and delivery costs since the Federal Fuel Administration first fixed their margins. The committee approved the request, and put the matter up to Washington. Attorney-General Palmer has notified dealers that while he cannot officially sanction the increase, he will not take any steps to combat it so long as the local committee has approved it.

Domestic bituminous therefore has gone up 50c. a ton all around. The 50c will be added to the revised steam coal price schedule being compiled from the average cost for steam coal purchased by dealers in December. Retail dealers now are permitted to add a margin of $2.08 a ton for steam coal delivered to manufacturers, $2.65 to apartments and churches and $2.80 to small domestic consumers.

Receipts from southern and eastern Ohio mines continue about 50 per cent of normal. While cars are short, labor is even more scarce, and the car supply last week just about equalled the actual need at the mines. Operators do not look for any great improvement in the labor situation until the President's Commission has reported and labor troubles are all adjusted. Incoming shipments are providing sufficient fuel for all industries, but the margin of safety is too small for comfort. Extremely cold weather this week and last has greatly increased consumption. Demand is so large, especially for steam coal, that in a free market prices would soar to easily twice the government maximums, operators say.

Pocahontas and Anthracite—All prices of both grades have been advanced 50c. a ton. Demand shows some increase, due to the recent zero spell, while receipts continue low enough to compel dealers to take business subject to delivery "when possible." Promised relief has not yet materialized, and much contract coal of both grades has been diverted.

Lake Trade—Unfavorable weather and a shortage of cars have combined to limit shipments off upper Great Lake docks. Daily shipments now are not averaging much over 1,000 cars, compared with nearly 1,600 daily in December. In November shipments from Duluth-Superior totaled 1,484,560 tons, and in December, 1,335,780 tons. January's showing may not be much over 1,000,000 tons. Even with decreased shipments, dock interests fear their stocks will be pretty well depleted by the opening of navigation, and will urge large early shipments from Lake Erie ports.

Prices of coal per net ton delivered in Cleveland are:

Anthracite—Egg, $12.25@12.40; Chestnut, $12.50@12.70; grate, $12.25@12.40; and stove, $12.40@12.60.

Pocahontas — Forked, $10.50@11.00; shoveled lump, $9.54@9.55; and mine-run, $8.25@8.50.

Domestic Bituminous — West Virginia splint, $8.30; No. 8 Pittsburgh, $7.80; Massillon lump, $8 to $8.10; Cannel lump, $11 and Coshocton lump, $8.10.

Steam Coal—No. 6 slack, $5.25@5.50; No. 8 slack, $5.20@5.50; Youghiogheny slack, $5.25@5.50; No. 8 lump, $6@6.25; No. 6 mine-run, $5.25@5.50; and No. 8 mine-run, $5.85@$6.

CINCINNATI

With empties at a premium in nearly all the mining fields in this locality, there was a decided downward curve in production, throughout the week, even from the very offset of the week, though the shortage in equipment was felt to a greater degree in the West Virginia regions.

The market during the past week was active, with domestic sizes in demand. However, there is a coal shortage here but its effects have not been felt to any great extent, because of the mild weather during the past ten days.

The embargo on tidewater shipments over the Chesapeake & Ohio is still on but so far it has not materially helped any in this vicinity. Operators report the car supply during the past week only six per cent. Loadings were limited in the Kanawha field throughout the week, that region being visited by a car shortage, or rather a continuance of the car shortage so much in evidence during the latter part of last week.

Transportation facilities in the New River region have been so poor since the beginning of the new year that during the first week in 1920 mines as a rule had been unable to work over a period of two full days a week, although miners were available and demand was such as to have justified normal production.

There has been a steady demand for Ohio coal at least in the central part of the state, especially for domestic sizes, the domestic demand however not having been so pronounced further South in Ohio. Shippers find also a steady demand for steam grades.

Pocahontas producers have been making special efforts to increase exports owing to the larger prices allowed. Industrial plants who were complaining several weeks ago of not getting enough coal to operate their plan' ; on full time schedule, have been alloted more tonnage during the past week than they had anticipated.

Market conditions in so far as they effect northern and northeastern Kentucky have been conducive to large production but mines in that area named are not allowed to ship much coal West of Cincinnati in recent weeks. There has been in the last few weeks a steady demand for steam and block coals in all fields owing to the necessity of industries replacing their somewhat depleted stocks. Retailers have also been heavier buyers.

There have been no changes in prices as Government restrictions still prevail. Coal receipts by river were below normal the past week.

DETROIT

Detroit receipts of bituminous are greatly reduced by railroad embargo and car shortage.

Bituminous—With no supply on tracks for open market requirements, Detroit wholesalers and jobbers are finding it is an uphill task to supply those of their customers who have no contracts. Limitations on shipments resulting from insufficient car supply are made more exasperating by the curtailment of movement due to the embargo, which the Railroad Administration is using in the effort to head off a threatened freight congestion in Detroit and Toledo.

Only perishable products, government supplies and railroad fuel are exempt from the embargo restrictions. Though it is possible to get coal through by securing a special permit from the Railroad Administration, jobbers say it has not been easy to obtain permits and that even when shipments are sent forward under that arrangement, four days or a week are required to get the stock delivered.

Many of the operators, according to local jobbers, have contracts on their books which were closed before the strike and which take practically all the coal that the mines are able to send out, with the present faulty car-supply. While shipments from some mines have been greatly reduced by lack of cars, the same condition is reported to have necessitated closing others, particularly in the Hocking district in Ohio.

With most of the coal sent forward, moving either under contract or sold before it arrives in Detroit, jobbers say that buyers who are dependent for their supply on the open market are finding the pickings unusually thin. Responsibility, in part at least for the restricted car-supply is placed with the Railroad Administration. It is pointed out that many cars carrying coal, instead of having been unloaded during the strike, apparently were moved about the country or left standing on sidings.

Anthracite—Though warmer weather conditions have been reflected in a slight falling off in demand for anthracite, considerable of that form of fuel is still being sold. Some of the retailers apparently were successful in accumulating a little reserve, which was worn away rapidly during the recent period of extremely cold temperature. The renewal of supplies is made difficult at this time by the embargo.

LOUISVILLE

Car shortage the only factor of importance at the present time. Demand keen, but mines operating less than two days a week average. Improved car supply promised.

There is a good market for all grades of coal, and operators have the demand and the business, but no cars. Operations in the state as a whole are not averaging two days capacity per week. Some of the big companies report going five and six days without a car. One company with nine mines had five of them down for four days. The situation apparently is much worse on the Louisville & Nashville lines than on other lines.

E. R. Clayton, secretary of the Harlan Coal Operators Association, has advised Representative Robison, of the eleventh district, Kentucky, that operators are seriously considering complete shut down until conditions improve. In his letter he said: "Under present conditions this would be a calamity, as a large number of public utility plants and the domestic trade is depending upon us for coal. We have done all we can, and if the mines are closed down, the Railroad Administration will have to accept the responsibility."

A telegram sent in by the Southern Coal Operators Association stated that during the first week of January many mines worked two days, and during the second week only one day.

C. D. Boyd, traffic manager of the Southern Appalachian, Harlan and Hazard Coal Operators' associations, in a letter to J. W. Backham, of the senate, said: "The car-service section has now agreed to arrange for a car for car-interchange at Louisville and Cincinnati, by which it is meant that the Eastern car pool lines will deliver to the Southern carriers one empty coal-car for every carload of coal delivered to them. In addition to this, arrangements have been made to move empty foreign coal-cars in the Southern region to mines in eastern Kentucky and eastern Tennessee through Atlanta and Knoxville. We expect a material improvement in the near future if these agreements are carried out and instructions observed, and we have every reason to believe that they will be.

Operators claim that the only drawback is the coal car shortage, which is the most serious ever known. Production is said to be even smaller than during the strike, as during that period there were many mines operating, whereas there are but few mines that are getting two days a week now.

There is a heavy demand for domestic consumption as well and retailers are taking all the coal they can get. Railroads are confiscating coal, including lump. Charles Crush, of the Atlas Coal Co., Louisville retailers, reported four cars of lump seized by the Chespeake & Ohio, from West Virginia, and one car of eastern Kentucky lump seized by the Louisville & Nashville, since Jan. 1.

Operators are so loaded with business that they are not accepting orders. One retailer reported that he sent out twenty letters asking for five or ten car-lots of block, mine-run, or screenings, at spot cash, and failed to secure an answer from any of the eastern Kentucky mines.

BIRMINGHAM

Market conditions are much more favorable than for many months past, with strong inquiry for both steam and domestic fuel. Production rapidly approaching wartime records. Labor and car shortage reported in a few instances, but lack of equipment has not seriously affected output as yet.

The Birmingham market is enjoying the best and longest spurt of active buying of steam fuel that has been noticeable in the past twelve months. The inquiry is good and of a general character—mostly spot sales being booked—though some small contracts have been made through a period of six months. Some of the railroads are buying additional tonnage to supplement contracts, and it is understood that practically all lines are short on storage coal. Public utilities and industrial plants are taking considerable coal, and the demand is such that all the coal being produced is readily absorbed and moves from the mines without delay.

The acute shortage in domestic sizes continues and retailers are not able to get a sufficient tonnage to take care of their customers' needs. The failure to produce sufficient domestic coal for the trade requirements is attributed in some quarters to the fact that the differential between the prepared and the mine-run prices in many cases is too small to warrant the extra expense and labor of making the domestic sizes. The major portion of domestic tonnage comes from steam-domestic operations, which do not produce domestic coal when the steam trade is dull and when it is active are inclined to dispose of mine-run product or steam coal only.

Production for the week ending Jan. 10 aggregated 360,000 tons or a gain of about 90,000 tons over the previous week. Working organizations are about as near normal now as labor shortage will allow and the output of coal will continue heavy as long as the requirements of the trade demand it. Slight complaint of car shortage was heard the past week but no material loss in production resulted.

TORONTO

Supplies adequate to present requirements. Some difficulties from car shortage—Fuel Administration warns consumers to lay in stocks, fearing shortage before spring.

Market conditions show little change, though the cold snap of the last few days has slightly increased the demand for anthracite. Supplies of both hard and soft coal are coming forward in sufficient quantities to meet present requirements, though there have been some delays in delivery by reason of car shortage, which will probably become more acute before the end of the winter.

Fuel Administrator H. A. Harrington has issued a warning to consumers not to depend upon the continuance of present conditions, as imports of coal are gradually decreasing. There is an insistent demand in the United States for steam sizes, with a possibility of a suspension of anthracite mining. He foresees a shortage and urges the laying in of stocks at once.

Quotations for short tons are as follows:

Retail

Anthracite egg, stove, nut and grate	$12.75
Pea	11.25
Bituminous steam	9.00
Slack	8.00
Domestic lump	9.00
Cannel	12.50

Wholesale f.o.b. cars at destination

Three-quarter lump	$6.50
Slack	5.75

Coke

CONNELLSVILLE

Production gaining very slowly and insufficient for demand. Car supply is the limiting factor. No information as to removal of Government price control.

Coke production in the Connellsville and lower Connellsville region is increasing week by week, but only by almost infinitesimal amounts, while the requirements have increased largely in the past few weeks. Thus the pronounced coke shortage continues, but it is a shortage due to inability of the region to increase its output largely, rather than to the output being curtailed as compared with the operations of October, November, and early December. The limiting factor visible is car supply and in some quarters it is claimed that a very moderate increase in car supply would uncover a labor shortage, which would then be the limiting factor, but this has not been proved.

Open market transactions in coke are extremely limited in volume, and are confined chiefly to foundry grade. The furnace coke output seems to be taken up quite fully by contract requirements, or by movement between producer and consumer who had contracts in the second half of last year, the shipments being continued, on the basis of the Government price limit. There is much talk as to when the price control will be removed, but no one seems to have any real information on the subject.

The market remains quotable at Government limits, $6 for furnace, $7 for selected 72-hour foundry, and $7.30 for crushed, per net ton at ovens. The *Courier* reports production in the Connellsville and lower Connellsville region in the week ended Jan. 10 at 240,390 tons, an increase of 2,654 tons.

Middle Western

GENERAL REVIEW

The demand for good coal is keeping up steadily; in fact it is increasing. This is particularly true in Iowa and the North west, although the trade in Indiana, Illinois and Missouri are ordering freely. At this time, of course, the matter of price does not enter into the market situation at all, as all coal which moves, either moves on contracts, or at the Government prices.

Practically all of the coal moving so far, is moving on old contracts and orders, because operators have not yet caught up with the shortage caused by the strike. Some distributors and operators however, are now taking on additional business, something which they were not doing two or three weeks ago. There have been some rumors that certain off grade coals in both Illinois and Indiana are not finding much of a market, in fact they are very difficult to move, but this is nothing unnatural when one considers that the best coal in the territory can be purchased just as cheaply as the poorest, as all coal is sold at Government prices.

It is persistently rumored that there are from 10,000 to 20,000 cars of Eastern coal on track in the West and Northwest, which were shipped here during the strike, and have not as yet been disposed of. If this rumor is true, it explains to some extent the car shortage, as this number of cars cannot be indefinitely tied up without hurting the coal industry. It is also rumored that the authorities are contemplating hauling all of this Eastern coal back, deadhead, as most of the coal was consigned, originally, to the steel mills and various industries in Pennsylvania and Ohio, but diverted West during the strike. As this territory appears unwilling to absorb this coal, the railroad authorities, from necessity, are forced to reship the coal back East where they know it can be disposed of readily. If this rumor has any foundation, there are a great many ways in which this condition of affairs might have been avoided, by use of a little grey matter, and a fair knowledge of the coal trade in the East and Middle West.

The labor situation appears to be fairly satisfactory and operators are becoming more optimistic daily as to the immediate future of the coal industry. A number of large factories which have heretofore been buying coal on the open market, are now clamoring for contracts, and we understand that a number of contracts have been closed—contracts to extend from date to Mar. 31, 1921. We know of one or two cases where five year contracts have been entered into, but the general run is until March 31, 1921. The car supply, of course, is a thorn in the flesh, at the present time, but it is thought that conditions will be very much improved when the railroads are put back under private ownership.

CHICAGO

Chicago is well taken care of these days by its coal supply. Every dealer has a comfortable tonnage in his yard, and all of our industries have either enough coal on hand, or in transit, to keep them from worry in the immediate future.

Looking at the Chicago market from a standpoint of demand only, we believe it is the poorest market in the whole Midwestern territory. However, there is a pretty good snow storm in progress, at this writing, and if it continues much longer, it will succeed in tying up traffic and delay shipments to Chicago.

Eastern coal is coming on in fairly normal quantities. There is enough hard coal being delivered to take care of the immediate wants, and Eastern coal from West Virginia and Kentucky is moving in fast enough to take care of the demand. In short, the Chicago situation, so far as coal is concerned, is fairly healthy and normal.

MILWAUKEE

Demand for coal not as brisk as the season warrants. Stocks are slowly being depleted, however. Prices unchanged.

Notwithstanding the prevalence of snappy winter weather favorable to a steady consumption of fuel, Milwaukee dealers say the demand for coal is not as brisk as could be expected. The drain upon stocks on the docks is becoming more noticeable with each passing day, however, and it is evident that rail-supplies will have to be drawn upon more heavily as the season advances. Illinois coal is being marketed here freely and the supply on track keeps increasing. Prices of all grades of coal, including the Illinois product, continue unchanged.